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THE ZOOLOGIST FOR 1861.

Pp. 7297—7824.

LONDON :

Printed by E. Newman, 9, Devonshire Street, Bishopsgate Street, N.E.

THE
ZOOLOGIST:
A
POPULAR MISCELLANY
OF
NATURAL HISTORY.

CONDUCTED BY
EDWARD NEWMAN, F.L.S., MEMB. IMP. L.-C. ACAD.

VOLUME THE NINETEENTH.



LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.

M.DCCC.LXI.

Nor, time regretting, will I e'er bewail,
Those hours I loitering spent, in woodland, mead and dale.

MILLHOUSE.

It may be deemed unmanly, but the wise
Read Nature as the manuscript of Heaven.

WILLIS.

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The 'ZOOLOGIST' will be continued both as a Monthly and an Annual Publication. As a Monthly, it will contain about forty pages of letter-press, occasionally accompanied with illustrations engraved on wood; will be on sale two days before the end of every month; and will be charged One Shilling. As an Annual, it will be sold on or about the 1st of December; will contain twelve Monthly Numbers, bound and lettered uniformly with the present Volume; and will be charged Thirteen Shillings. An Alphabetical List, both of Contributors and Contents, will be published once in the year.

P R E F A C E .

ON the completion of the nineteenth volume of the 'Zoologist' I have much pleasure in once more offering my sincere thanks to subscribers and contributors for their continued assistance and support: I regret to see so formidable a list of my own contributions, but this feeling is somewhat mitigated by finding that these are as brief as they are numerous, and also by the knowledge that I have never excluded the observations of another to make room for my own: I may add, that scarcely a line I have written owes its existence to what has been called the *cacoethes scribendi*, each brief memorandum being little more than a compilation from materials obligingly placed in my hands for the express purpose of publication.

Concerning papers reprinted from other works I trust there will be but one opinion: it seems to me that the 'Zoologist' would be incomplete were I not to incorporate these gems of Natural-History literature with the interesting communications designed expressly for these pages; but, much as I value them, I may truly say I have never published such extracts to the exclusion of original contributions.

With regard to the able and logical remarks lately published on the 'Origin of Species,' I wish to disclaim both the merit and the responsibility of the opinions expressed: I desire to reserve my own views on this deeply interesting subject until more mature consideration may render that opinion worthy of respect: nevertheless I am glad to bear my willing testimony to the fact that Mr. Darwin's profound knowledge, chivalrous fairness and extreme courtesy have combined in giving him an advantage over many of the incompetent and irascible critics who have heretofore assailed him: in the 'Zoologist' Mr. Darwin has received fair play; and should the strictures in its pages prove more damaging to his theory than any previous review, it will certainly be because their tone and character are more accordant with the spirit in which that theory is explained and advocated by himself.

Several very interesting problems in Natural History still await solution, and the 'Zoologist' is the only journal in which such solution can be brought before those who will regard it with real interest.

Ornithologists have not yet shown us how the cuckoo's egg is introduced into nests which, from their situation, the cuckoo herself could not enter: neither have they ascertained what care is taken by the cuckoo of her apparently neglected offspring. Erpetologists have neither disproved nor established the universally accredited assertion that the young adder flies to its mother's stomach as a place of refuge from approaching danger: it is easy for some of us who are sceptical on such points to boast of our unbelief; but how shall we explain away the vast amount of independent and corroborative evidence! Again, how little is known of our bats! and with what gratitude should we not receive a concise summary of their distinguishing characters and habits! In Entomology the problems awaiting solution are numberless. Where in our collections shall we place *Acentria nivea*? our lamented friend James Francis Stephens associated it with the Neuroptera: Hagen and Westwood guess it is lepidopterous; while Guenée and Doubleday, whose judgment on any question relating to Lepidoptera we should all prefer, absolutely and unhesitatingly reject it from that class: Mr. Brown, of Burton-on-Trent, informs us (Zool. 5919) that he has "proved *Acentria nivea* to be a lepidopterous insect," and in explanation adds, "The pupa-case puts the relationship of *Acentria* beyond a doubt; it is clearly the chrysalis of a moth." This may be so, but a prior definition is required. What is the essential difference between the chrysalis of a moth and the chrysalis of a Phryganea? Why will not some of our young entomologists investigate this matter? Let them define the locomotive, the cibarian, the metamorphic characters of Lepidoptera and of the Phryganidæ; compare and contrast them; and then, returning to *Acentria*, let them say with which of these it has most characters in common. Our present state of ignorance and uncertainty is not creditable.

EDWARD NEWMAN.

9, Devonshire Street, Bishopsgate Street,
November 21, 1861.

THE ZOOLOGIST

FOR 1861.

NOTICES OF NEW BOOKS.

'*The Romance of Natural History.*' By PHILIP HENRY GOSSE, F.R.S.
372 pp. demy 8vo; twelve plates. London: Nisbet & Co.,
Berners Street, Oxford Street. 1860. Price 7s. 6d.

"There are more ways than one of studying Natural History. There is Dr. Dryasdust's way; which consists of mere accuracy of definition and differentiation; statistics as harsh and dry as the skins and bones in the museum where it is studied. There is the field-observer's way; the careful and conscientious accumulation and record of facts bearing on the life-history of the creatures; statistics as fresh and bright as the forest or meadow where they are gathered in the dewy morning. And there is the poet's way; who looks at nature through a glass peculiarly his own, the æsthetic aspect, which deals, not with statistics, but with emotions of the human mind,—surprise, wonder, terror, revulsion, admiration, love, desire, and so forth,—which are made energetic by the contemplation of the creatures around him.

"In my many years' wanderings through the wide field of Natural History, I have always felt towards it something of a poet's heart, though destitute of a poet's genius. As Wordsworth so beautifully says,

'To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.'

"Now this book is an attempt to present Natural History in this æsthetic fashion. Not that I have presumed constantly to indicate—like the stage directions in a play, or the 'hear, hear!' in a speech—the actual emotion to be elicited; this would have been obtrusive and

impertinent; but I have sought to paint a series of pictures, the reflections of scenes and aspects in nature, which in my own mind awaken poetic interest, leaving them to do their proper work.”—*Preface.*

In these words does Mr. Gosse herald in his new publication, which is one of the most readable and agreeable of all his readable and agreeable books. The plan, if there be a plan, is most desultory—just that touch-and-go style which will secure the attention even of the most indolent reader: thus we leap from lions to butterflies; then plunge into brine and boiling springs; ascend the blue vaults of heaven after insects, and seek flying fish in bed and shoals of swimming fish in a parlour: next we enjoy a sojourn with serpents; then wander among groves of Cacti; and then mount the dragon tree of Oratava. Afterwards we are introduced to the whale and the elephant, the mammoth tree of California and life in a drop of water: to the jackal, the wolf and gorilla; and witness a fatal encounter with bees.

I have really enjoyed this book, it is most delightful; and although the mixture of subjects strikes one as rather heterodox in a work on Natural History, there will be found a method running through the whole that strings the diverse subjects together, producing a pleasant combination, like beads of various size and colour.

Mr. Gosse patronizes the sea serpent, and pleads for him apologetically, but gives us without any hesitation the history of that arch-myth the tsetse: I believe, whenever a competent naturalist shall investigate the subject he will find the tsetse a disease, which the ignorant aborigines have falsely attributed to an insect: but this is of no moment; difference of opinion detracts nothing from merit; and I may truly say that I never read a book with more real pleasure than the ‘Romance of Natural History,’ and I know none that I can more cordially and unhesitatingly recommend to my subscribers. I hope to return to it again and again for amusing and instructive scraps to insert in the pages of the ‘Zoologist.’

‘*Actinologia Britannica: a History of the British Sea Anemones and Corals.*’ By PHILIP HENRY GOSSE, F.R.S. Demy 8vo; 400 pp. letter-press; twelve plates, printed in colours. London: Van Voorst, Paternoster Row. 1860. Price 21s.

I do not like the first title. Mr. Gosse, as we have just seen, abjures the Dryasdust school, abjures the must and dust of the

museum, and yet applies a barbarous græco-latin name to this truly beautiful book. I have said barbarous: the word *Actinologia* is not actually a barbarous compound, being derivable from *actin*, *actinos*, a sun-beam or sun-ray, and *logos*, a treatise or discourse thereon; but it can have no reference to sea anemones. If Mr. Gosse was determined to conciliate Cerberus, or the spirit of technicality, by throwing him a sop, his offering should have been 'Actinotologia,' which is Greek for a discourse on things radiate, of course including radiate animals, and of course, also, sea anemones: this word, moreover, has the great additional merit, always prized by the technicopholists, of being more difficult to pronounce.

Having criticised the title, I will not also criticise the work. Mr. Gosse, treating of sea anemones, is on virgin soil; for I cannot regard the works of Johnston, Milne-Edwards or Tugwell as doing more than indicating the existence of such a tribe of animals; Dr. Johnston, the best of the three, ranks high as an agreeable, discursive and poetical writer on Natural History; but he totally fails in differentiating species among the animals under consideration. Mr. Gosse is the first author on sea anemones who conveys to his reader the idea that he understands what he is writing about; and his plates, printed in colours, most beautifully illustrate his descriptions.

Mr. Gosse's style is always delightful; ample without being verbose; perspicuous without repetition. I cannot do my readers or Mr. Gosse a greater service than by extracting a passage from the history of *Actinoloba Dianthus*.

"A very heterodox notion seems to have obtained currency, that this species differs from other *Actiniæ* in that it is incapable of altering its place when once it has selected it. Dr. Johnston says—and his statement is the more surprising since he had seen several hundreds of individuals—'As *A. Dianthus* is a permanently attached species, and cannot be removed without organic injury to the base, it has some claim to be made the type of a genus.' (Brit. Zooph. p. 234). If this were correct the claim (which I have allowed on other grounds) would indeed be well founded; but the statement is erroneous. Sir John Dalyell, again, while allowing that *A. Dianthus* shifts its position spontaneously, affirms that it cannot be compelled to do so with impunity. In illustration of this assertion he mentions the case of a very large one which was attached to a stone too wide to be put into any of his vessels. In this emergency he reversed the stone, laying it across the top of a jar, so that the anemone should hang suspended in the sea-water. He had hoped that the animal would voluntarily

quit its hold, and descend into the jar, but it did not; and, after stretching itself for some days, it ruptured its body across the centre, apparently by its own weight, and died.

“Notwithstanding these excellent authorities, however, I can unhesitatingly affirm, both that the species travels as freely as any in captivity, and that it may be removed from its attachment with the utmost ease and impunity. In ‘The Aquarium’ (p. 192) I had given evidence of both these facts, and experience has since confirmed them in numberless instances. Instead of repeating my own observations, however, I will fortify them with the authority of my friend Mr. Merriam, of Bridgenorth, who has favoured me with the following remarks on this subject:—

“‘Dr. Johnston’s statement is not confirmed by my experience any more than yours. I have a very fine specimen of *A. Dianthus*, which persisted in crawling up the side of my glass, a circular one, until part of its disk was actually above “high-water level.” A few days ago it became necessary to empty my glass. Accordingly I drew off the water, and the *Dianthus* hung in the most disconsolate way, looking very like an old wet kid-glove. Finding I could not finish my operation without entirely removing him, I worked him off with the back of my nail. Of course at the first rude touch on his base he shrank up into a ball, in which shape he continued, when I dropped him into some water to remain until I could restore him to his own home. While here he became quite like a ball of cotton, so many were the nettling threads that he threw out on all sides. In two hours’ time I put him back into the glass, having taken the precaution to place a bit of slate upright behind him, that I might not have the same difficulty again. In less than six hours he had stuck as firmly to the slate as he had previously done to the glass, and he has continued most magnificent ever since.’

“In spite of Sir John Dalyell’s assertion that this species is ‘less hardy than most,’ the fuller aquarian experience of the present day enables us to affirm that no British species is more readily preserved in confinement than *A. Dianthus*. There are probably thousands of specimens of this fine anemone now living in the aquariums of Great Britain and Ireland; and a large number of these have been several years in captivity. They continue to live and flourish, expanding and erecting themselves with the greatest freedom; nor do they seem at all affected by the turbidity of the water, provided it be free from impurity. I have had some specimens of rather large size continue for many months in water so loaded with green *Alga* spores as to be

almost opaque, yet during the whole period they appeared perfectly at ease, and even increased their number by fissiparous division. It is the frequent habit of the species to crawl up the perpendicular side of the tank which it inhabits, till it reaches the water's edge, a situation which seems particularly grateful to it, for there it remains from week to week, daily (or rather nightly) projecting its columnar form in a horizontal direction, at the very surface, and then expanding its beautiful frills, so that the air bathes a part both of its body and its tentacles.

“ I have never seen this anemone increase its kind by proper generation, that is, by the discharge of ova or of young. But no species more freely increases by spontaneous division. When a large individual has been a good while adherent to one spot, and at length chooses to change its quarters, it does so by causing its base to glide slowly along the surface on which it rests, the glass side of the tank for instance. But it frequently happens that small irregular fragments of the edge of the base are left behind, as if their adhesion had been so strong that the animal found it easier to tear its own tissues apart than to overcome it. The fragments so left soon contract, become smooth, and spherical or oval in outline, and in the course of a week or fortnight may be seen each furnished with a margin of tentacles and a disk,—transformed, in fact, into perfect though minute anemones. Occasionally a separated piece, more irregularly jagged than usual, will, in contracting, constrict itself, and form two smaller fragments, united by an isthmus, which goes on attenuating until a fine thread-like line only is stretched from one to the other; this at length yields, the substance of the broken thread is rapidly absorbed into the respective pieces, which soon become two young *Dianthus*es.

“ It is to this tendency to spontaneous division that I would attribute the frequent occurrence in this species of monstrosity, such as two disks uniting into a single column. This is very common. Dr. Johnston supposes that such cases are produced by the coalescence of two individuals which happened to be in contact, and he accounts for its frequency by the gregarious habit of the species. The possibility of two individuals thus uniting remains, however, to be proved; while the fissiparous habit, which is patent, is quite sufficient to produce the phenomenon.

“ I have been informed of a case in which a young one was produced by gemmation from the base of the adult, without any previous separation of the fragment.”

In this way does Mr. Gosse pleasantly discourse of every species as it comes in turn before him, always convincing his reader how intimately he is acquainted with the beautiful flower-animals he is describing.

‘ *A Guide to the Isle of Wight.*’ By the Rev. EDMUND VENABLES, M.A.; and eminent local Naturalists. Demy 12mo; 526 pp. letter-press, and a detached map. London: Edward Sandford, 6, Charing Cross. 1860.

At first I felt greatly astonished that a book of 500 pages could be written about the Isle of Wight, the subject having been so thoroughly worked by previous literary adventurers. Mr. Venables seems to anticipate this feeling, and meets any objections that may arise in the following manner:—

“The number of books professing to direct the tourist to the chief beauties of the Isle of Wight, and to point out to him its principal objects of interest, is already so great that the publication of another work with the same end in view may seem almost to need an apology. Numerous, however, as the Isle-of-Wight Guides are, it has been felt by many that they have hitherto hardly kept pace with the progress of modern research, and that there is still room for one which, while it presents a faithful picture of every part of the island, and furnishes details essential to the rapid holiday-maker and ordinary seeker after the picturesque, may also promote and direct the habits of observation now happily becoming so general, and supply such information respecting the history, antiquities and architecture of the island, as well [as] the natural treasures it contains, as may satisfy every taste, and aid the tourist in the pursuit of his favourite science, whatever it may be.”—*Preface.*

With respect to the “rapid holiday-maker,” I can scarcely fancy him driving about the island with a tome of 500 pages under his arm; neither do I think that “the progress of research” has added much to “the history, antiquities and architecture of the island;” but that branch of Isle-of-Wight science which it is the province of the ‘Zoologist’ to notice has received, and is receiving, constant accessions and illustrations: of course I allude to its Zoology; and this part of the work has been chiefly compiled by Mr. A. G. More, than whom a more careful, more competent or more enthusiastic coadjutor could not have been found.

The sucklers and birds of the island have already been enumerated in the 'Zoologist,' by the Rev. C. A. Bury; and Mr. More has availed himself largely, and very properly, of Mr. Bury's labours: the birds are arranged on the plan proposed by myself in the Appendix to the 'Letters of Rusticus,' and divided into—residents, 58 in number; summer visitors, 28; birds of double passage, 8; winter visitors, 41; and occasional visitors, 85.

The reptiles and fishes are given by Mr. More: among the former the absence of the natterjack is remarkable. Nine common fresh-water fishes—namely, the pike, perch, ruffe, gudgeon, barbel, grayling, chub, loach and minnow—are also absent from the list: the only fresh-water fishes ascertained to be inhabitants of the island are the river bull-head, the smoothtailed stickleback, rough-tailed stickleback, spined stickleback, carp, tench, rudd, roach, dace, trout, sharp-nosed eel and broad-nosed eel. Does the absence of the nine fishes I have first named indicate a Natural-History fact, or the absence of observation?

Three excellent entomologists—Mr. Guyon, Mr. F. Smith and Mr. More—contribute a chapter each on insects: Mr. Guyon on Coleoptera, Mr. F. Smith on Hymenoptera, and Mr. More on Lepidoptera. The Diptera, Orthoptera, Hemiptera, Stegoptera and Neuroptera of the island are entirely omitted.

A list of the land and fresh-water shells is given by Messrs. Guyon, Hambrough and More; and this is the most careful and complete of all the zoological lists.

The Botany of the island is also sketched; but this has been so completely and elaborately treated by the late Dr. Bromfield that nothing remained but to give an abstract of his labours, and this has been admirably performed by Mr. More.

It is with confidence, then, that I recommend this volume to the naturalist visiting the Isle of Wight; he will find it a reliable guide, and a pleasant companion when he returns to his inn after the labours of the day have ended.

'*Journal of the Proceedings of the Linnean Society.*' Vol. v. No. 18, dated November 14, 1860. Contains 48 pp. letter-press of Zoology, 56 pp. of Botany; and one zincograph botanical plate. London: Longman & Co. Price 3s.

This number contains the following zoological papers:—

1. A List of the Shells observed or collected at Mogador, and in its

immediate environs, during a few days' visit to the place, in April, 1859; with notes and observations. By the Rev. R. T. Lowe, M.A.

2. On the Homologies of the so-called Univalve Shell and its Operculum. By John Denis Macdonald, R.N., F.R.S.

3. On the Occurrence of *Gyrodactylus elegans* on Sticklebacks in the Hampstead Ponds, January, 1860.

4. Discovery of *Alpheus Edwardsii* on the Coast of Cornwall. By Jonathan Couch, F.L.S.

5. On the Poisonous Effect of a small portion of the Liver of a *Diodon* inhabiting the Seas of Southern Africa. Communicated by Sir John Richardson, M.D., F.R.S.

The case recorded of the poisonous effect of the liver of a *Diodon*, written by Mr. Hugh Jameson, Surgeon to H.M.S. 'Winchester,' is of great interest. Mr. Jameson says:—"About 12.40 P.M., on the 4th of September, my assistance was requested on board the Dutch brig of war 'Postilion,' on account of two men who were said to have been poisoned by eating part of a well-known deleterious fish common in Simon's Bay. I immediately repaired on board, but on arriving found that both men had expired some minutes before. * * * It is said to have been the liver of a single fish that was eaten: it is known in Simon's Bay by the name of the toad-fish. It seems they were aware, or had been warned, that the fish was poisonous, but were resolved to try the experiment, the boatswain asserting that the liver was not so, but rather a delicacy. This fish is from 6 to 8 inches long, and the liver may have weighed about 4 drachms. Dinner had been piped to at 12 o'clock, after finishing which the fatal morsel was cooked: this could not have been sooner than twenty minutes after 12 o'clock. At 12.45 I got on board, at which time life had been extinct for some minutes; so that the period from the taking of the poison until death could not have exceeded twenty minutes." Another account states the time between eating and death to have been seventeen minutes. On a *post-mortem* examination "there was no vestige of anything like the poisonous substance that had been swallowed;" and it is also stated that the "cook who had fried the liver for the others, and had eaten a small portion, exhibited no alarming symptoms."

The name of the fish is rather vaguely given in this manner:—"Apodactylus punctatus? or Tetraodon, *Cuvier*."

In perusing the paper with that careful attention which so important a communication deserves, I cannot help thinking that sufficient pains were not taken to establish the fact that eating the liver of

the fish was the cause of death. It is to be remarked that the poisonous matter was not found in the stomachs of the sufferers; and that the cook, who also ate, escaped harmless. Would it not also be well to identify the fish more positively, and to distribute correct figures thereof as a warning to others?

'*The Canadian Naturalist and Geologist.*' Vol. v. No. 3, dated June, 1860; 80 pp. letter-press. No. 4, dated August, 1860; 88 pp. letter-press. Both numbers illustrated with Woodcuts. London: Sampson Low, Son & Co. Price 3s. each.

No. 3 contains the following papers:—

Art. XIII. New Species of Fossils from the Lower Silurian Rocks of Canada. By E. Billings.

Art. XIV. Notices of the Life of the late Professor George Wilson, of Edinburgh.

Art. XV. Notice of Tertiary Fossils from Labrador, Maine, &c.; and Remarks on the Climate of Canada in the Newer Pliocene or Pleistocene Period. By J. W. Dawson, LL.D., F.G.S.

Art. XVI. Abridged Sketch of the Life of Mr. David Douglas.

Reviews and Notices of— 1. The Life, Travels and Books of Alexander von Humboldt, with an Introduction by Bayard Taylor. 2. A First Lesson in Natural History, by Actæa (Mrs. Agassiz). 3. A Manual of Scientific and Practical Agriculture for the School and Farm, by J. L. Campbell, A.M. 4. The British Tortrices, by S. J. Wilkinson [extracted from the 'Athenæum']. 5. The Rudiments of Botany, Structural and Physiological, by Christopher Dresser [extracted from the 'Athenæum']. 6. Professor Hall's Report of the Geology of Iowa. Correspondence. Report of the Meeting of the British Association at Aberdeen [extracted from the 'Athenæum']. Miscellaneous.

No. 4 contains the following papers:—

Art. XXXVII. [the previous article is numbered XVI.] A Systematic List of Lepidoptera collected in the Vicinity of Montreal. By W. S. M. D'Urban.

Art. XXXVIII. Abridged Sketch of the Life of Mr. David Douglas.

Art. XXXIX. On the Track of an Animal lately found in the Potsdam Formation. By Sir W. E. Logan, F.R.S.

Art. XL. Notes on the Coal-fields of Pictou. By H. Poole, Esq.

Art. XLI. On new Localities of Fossiliferous Silurian Rocks in Eastern Nova Scotia. By the Rev. D. Honeyman.

Art. XLII. Note on a Specimen of *Menobranthus lateralis* taken at London, C.W. By W. Saunders, Esq.

Art. XLIII. On some new Species of Fossils from the Limestone near Point Levi, opposite Quebec. By E. Billings.

Miscellaneous and Reviews.

May I, without offence, recommend a little more care on the part of the Editor in the matter of correcting the press? I do not allude to the occasional misprints, of which so copious an "errata" is given at p. 240, but to errors which mystify the reader beyond all bearing; thus 100 pages are dropped at p. 288; the following page is 189, and the numbers are continued just as though nothing extraordinary had happened—190, 191, &c. In like manner Art. XXXVII. immediately follows Art. XVI. It is dangerous for those who reside in glass houses to throw stones, and I am well aware of the fallibility of all editors; but these are errors of unusual magnitude, and will render indexing impossible.



'*The Journal of Entomology, Descriptive and Geographical.*' London: Taylor and Francis, Red Lion Court, Fleet Street. 1860. No. 1 contains 64 pp. letter-press and three plates; price 3s. No. 2 contains 68 pp. letter-press and five plates; price 5s.

The proprietors explain the objects of the journal in the following "Notice":—

"The 'Journal of Entomology' has been projected to supply the want of an entomological periodical devoted to the descriptions of new species, and to the geographical distribution of insects generally. It is intended to figure the new or little-known forms, as far as possible; and with regard to the latter, local lists and monographs will be one of its leading features. The Journal will be published at intervals of three or four months, or perhaps oftener; and the price will vary according to the number of plates and the amount of letter-press."

The proprietors having selected the month of April for making their *début*, their first number appeared with the following papers:—

Art. I. On the Halcidæ of the Canary Islands.' By T. Vernon Wollaston, Esq., M.A., F.L.S.

Art. II. Remarks on the Pollinosity of the Genera *Lixus* and *Larinus*. By M. Henri Jekel, Member of the Entomological Society of France, &c.

Art. III. Characters of undescribed Species of the Genus *Leucospis*. By F. Walker, Esq., F.L.S.

Art. IV. Descriptions of new Genera and Species of *Eumolpidæ*. By J. S. Baly, Esq.

Art. V. Notices of new or little-known Genera and Species of *Coleoptera*. By Francis P. Pascoe, Esq., F.L.S.

No. 2, published on the 1st of October, contains the following:—

Art. VI. Descriptions of new Genera and Species of Exotic *Hymenoptera*. By Frederick Smith, Esq.

Art. VII. On the *Coleoptera* of the Salvages. By T. Vernon Wollaston, Esq., M.A., F.L.S.

Art. VIII. Descriptions of Six new Species of *Chrysomela* from the East. By J. S. Baly, Esq.

Art. IX. Notices of new or little-known Genera and Species of *Coleoptera*. By Francis P. Pascoe, Esq., F.L.S.

These articles appear to contain carefully-written descriptions of additions to the insect fauna of the world, and thus they must necessarily be acceptable to every entomologist. The only paper adapted for citation in the pages of the 'Zoologist' is that by my friend M. Jekel, on the pollinosity of certain *Curculionidæ*,—a paper, however, which is rather suggestive than conclusive, but one which the author seems inclined to consider as disclosing characters capable of tabulation. Without attempting in any way to undervalue M. Jekel's labours, I cannot say that I am prepared to accept his arrangement of the supradermal coverings of *Coleoptera*, although I see much utility in his suggestion "to lay bare the derm in order to display its characters." I may observe that M. Jekel's somewhat imperfect knowledge of English may possibly have led him in some instances to use our words in a sense not usual amongst ourselves; but I have not ventured to introduce any alterations, because the meaning is in all cases sufficiently obvious.

"With respect to the tomentosity and pollinose transudations of *Lixus* and *Larinus*, I think it will not be out of place to mention here a fact until now overlooked, so far as I know. It appears to me, from long observation of the covering adorning many *curculionideous* beetles, that nature acts in clothing them by layers or coatings; there is immediately above the derm of the elytra and thorax a thin

tomentose squamosity either more or less piliform and opaque or very fine silky and bright: this ground-layer, common to many other tomentose Coleoptera, is comparatively persistent, though far more easily rubbed off than setiform or hairy pilosity, and is analogous to the squamosity of species having one layer only: this tomentosity is not produced by exudation, but grows according to the general law, is susceptible of partial or total baldness, as in merely squamose insects, and if rubbed off when the insect is alive would be restored in course of time only. Then comes the second layer, much less persistent (even in non-pollinose species), which in the above two genera, as in many others, is a real pollinose transudation, susceptible of a relatively immediate renewal when rubbed off the living insect. Of this upper layer I need not remark, after the conscientious observations of M. Godart, the highly interesting controversies of MM. Coquerel and Laboulbène, and the experience of M. Rojas, all recorded in the 'Annales de la Société Entomologique de France,' 1851—1857.

“Hence the results in pollinose species are these: specimens may have their pollinosity more or less rubbed off, and show underneath part of the ground squamose tomentosity; others may be completely deprived of that pollinose efflorescence, and show the ground tomentosity only; finally, others, still more rubbed, show only a portion of the latter, &c. Any entomologist, therefore, in describing either squamose, tomentose or pollinose species, should not content himself with the description of so variable a substance only, but note also if there is another layer beneath it, and, in fine, should lay bare the derm, in order to display its characters.

“Exclusive of hair or pile, to which (like naked Coleoptera) squamose, tomentose or pollinose species are liable, one might divide them, according to the composition of their clothing, as follows:—

“1. COL. MONOLEPIDA: having a single layer of squamosity or tomentosity, with or without denser markings.

“2. COL. DILEPIDA: having two layers of squamosity or tomentosity, one inferior with or without denser markings, generally of a pale unicolor hue (gray, ashy or whitish); the other superior, less persistent, easier rubbed off, increasing or modifying the coloration of the markings, when they exist, and filling more or less the areas between the markings.

“3. COL. PAIPALEPIDA: ground-layer tomentose, following the same laws as in class 2; but superior layer being a pollinose transuda-

tion, more or less deeply colouring the ground, as well as the ground-markings, when they exist.

“To complete the various modes in which the derm of Coleoptera presents itself to the eye of the entomologist, the naked species (always exclusive of hair or pile) should form the fourth class (or rather the first of all), *viz.* :—

“4. COL. ALEPIDA [without scales].”

The Elephant Horse.—A hairless horse is now being exhibited at Mason’s riding-school, at Brompton, as an “elephant-horse brought from Ceylon by an officer in the Indian army.” The following paragraph, showing how such curiosities may be produced, is extracted from the ‘Field’ newspaper of the 1st of December.—*E. Newman.*

Another Hairless Horse.—Mr. Buckland’s description of an elephant-horse, in a late number of the ‘Field,’ brought to my recollection a “Nile-horse” of which I had read an account in the ‘Philosophical Magazine’ for 1801; and as the history of this latter animal involves a curious physiological problem, while it discloses a gross act of showmanship, perhaps it may not be without some interest to the reader. About 1796 a French showman, named Alpy, who had previously been an attendant in the Royal Menagerie at Versailles, exhibited what he termed a Nile-horse over the greater part of Germany. This animal was almost utterly destitute of hair, for the report, drawn up with great minuteness by the officials of the Veterinary College of Berlin, states that it had only one hair on its whole body, *viz.*, “a black bristle, three-tenths of an inch in length, on the lower eyelid of the left eye.” Alpy, of course, told a romantic story about the animal,—how it had been taken, after a terrific hand-to-hand combat, by an Austrian officer from a Turkish bey; how sultans and pachas had offered fabulous amounts in gold and jewels for its ransom; and that it was one of a race of hairless horses whose habitat was on the banks of the upper waters of the river Nile. As the horse seemed to be about fifteen years of age, Alpy was induced to sell it to the Veterinary College of Berlin for fifty louis-d’ors, a very smart sum for a horse at that time and place. The German, French and English scientific periodicals noticed the strange animal, all agreeing that it was of a decidedly distinct race from the common horse; the only point of discussion being with respect to its native country. Professor Nauman, in his ‘Manual of the Science of the Horse,’ gave not only a description, but also an engraving of the hairless brute, and gravely added his reasons for concluding that it was a native of the little-known tropical regions of Africa. For four years this animal had been the lion, wonder and pride of the Berlin College; when one day a country farrier, named Sebald, from Ulm, in Suabia, visiting the college, immediately recognized it as an old acquaintance. He knew it, he said, when a foal,—when it had as good a coat of hair on it as any other horse; he could even tell what caused its hair to fall off, but, as may be supposed, he was most unmercifully pooh-poohed by the *savans* of Berlin. They did more: they proclaimed the country farrier’s utter ignorance of horseflesh, and even demeaned themselves by ridiculing the rude *patois* of the Suabian. Sebald’s *amour propre* was hurt in the tenderest part: he well knew that he was right, and he determined to trace the history of the animal to its minutest point. He did so, and incontestibly proved that

the horse was no other than a common German hackney. I need not follow Sebalde's history of the animal from a colt; suffice to say that it had belonged to a coach proprietor in Franconia, and then was in no respect different from any other horse of its kind, except that it was taken with the strangles. The coach proprietor then sold it to a neighbouring peasant, who, according to the custom of the country, gave the horse leaves of the savin-tree (*Juniperus Sabina*) as a cure for the disease. The savin apparently cured the horse, but the peasant, to prevent a relapse, gave it more or less of those leaves for a whole year. In the meantime the horse began to have a nice, sleek coat of hair, which, however, soon dropped off, leaving the animal almost naked: another coat ensued, and this also soon dropped off. Nature, however, made a last effort: the hair grew for a third time, but once more dropped off entirely, and never attempted to grow again. The peasant continued to work the animal, but was so annoyed by the neighbours laughing at his naked horse that he took it back to the coach proprietor, and begged that he would take it off his hands on any terms. The coach proprietor did so, and, taking it to another part of the country, exhibited it as a Cyprus-horse; but, dreading a very salutary German law which places what we may term the high art of the noble science of showmanship in the same category as swindling, he sold the animal to an Italian exhibitor, who took it to France. The Italian, in turn, sold it to Alpy, who brought it back to Germany, where it became famous as the Nile-horse.—*William Pinkerton.*

Occurrence of Hyperödon rostratus at Weston-super-Mare.—I am induced to send the measurements of the *Hyperödon* lately shot at Weston-super-Mare, on account of the interest attached to this little-known group, and also because to a good figure and description in the 'Illustrated London News' for November 17 is appended the wrong name. The Weston specimen was 26 feet long, from posterior origin of dorsal to insertion of tail 6 feet, from ditto to snout 18 feet. Dorsal fin 1 foot 11 inches long, 1 foot 5 inches high. Tail 1 foot in diameter, 2 feet in depth. Vertical height of forehead from gape 1 foot 8 inches, ditto from upper jaw (insertion) 10 inches. Cloaca to insertion of tail 5 feet 3 inches. Pectorals 2 feet 5 inches in length, 9 inches in breadth; distance between pectorals beneath 1 foot 8 inches. Height of body at anterior base of dorsal 4 feet, at insertion of tail 1 foot 4 inches, circumference at base of pectorals 11 feet 6 inches, at blow-hole 9 feet 6 inches, at anterior insertion of dorsal 10 feet, from gape to muzzle 2 feet, from gape to eye 2 feet, from eye to spiracle 2 feet. Spiracle $5\frac{1}{2}$ feet from cusp to cusp, but it is doubtful (an anchor having been placed in it) whether the cusps were forward or backward; I think the former. The species is, no doubt, *Hyperödon rostratus*, and the figure in Bell's 'Quadrupeds' called *H. Butzkopf* is very like it. I have not yet been able to examine the mouth for teeth, but it is probable that two exist in the lower jaw. What cause should have impelled these northern animals to visit our shores, first at Whitstable and then at Weston, is quite conjectural. In 1841 a whale of this species was killed near Bristol, and is there preserved, at least the skeleton; and now, after a lapse of twenty years, two more are observed to wander up the same channel.—*W. D. Crotch; Uphill House, Weston-super-Mare, November 18, 1860.*

Capture of a Whale in Loch Sunart.—The following account of the capture of a whale, which I have just received from my Highland home, Strontian, on Loch

Sunart, Argyleshire, may interest some of your readers: — "Yesterday a few people had an exciting adventure with a whale, which was noticed by Angus Graham, in the forenoon, swimming about at the head of the loch (Sunart). Beaton, and his brother of the smack 'Phoenix,' were along with him. They got two harpoons made out of rod iron, with a ring at one end, to which they attached ropes; and two boats, with Hamilton the smith and a few others, set off in pursuit. When they came up with the whale Beaton, who is a daring fellow, struck at it with one of the harpoons; after three attempts he succeeded in fixing it about two feet above the tail, and it held fast. Away went the whale, dragging the two boats after it, at steamboat speed. It crossed and recrossed the loch (nearly a mile broad), grounding and getting off again. At one time it went below Hamilton's boat, and gave it a lift that nearly upset it; at another time it went close past the boat, and broke an oar that Graham put down to keep it off. After a three-hours' chase the whale grounded at the head of the loch, having become exhausted; and your keeper Munro fired, and put a ball through the head. The whale was thus secured, and when dead was towed to the beach at the Greenfield, where young and old have been to see it. It is twenty-four feet long, and is, I presume, of the bottle-nose variety. It is thought to be a female. The blubber will be run into oil, and divided among those men who were engaged in the capture. They owe their success chiefly to the daring of Beaton, who is master of a smack belonging to Mull."— *Thomas M. Riddell, in the 'Field'; Perth, November 27, 1860.*

Occurrence of the Spotted Eagle (Falco naevius) in Cornwall.—The capture of this rare eagle took place on the 4th instant, in the eastern part of Cornwall, at a large covert called Hawk's Wood, the property of Francis Rodd, Esq., of Trebartha Hall, adjoining the large moors between Hawk's Tor and Kilmar, and not very far distant from the well-known Cheesering. Hawk's Tor and Kilmar Tor rank amongst the highest hills in Cornwall, reaching an altitude of from 1000 to 1200 feet: the character of these hills and the moors about them in every direction is exactly similar to those on Dartmoor; in fact, the range is a continuation of the great granite tract, extending, with some few interruptions, to the Land's End. The capture of this bird deserves a notice: it was observed first in a tree, and on the approach of the shooting party, instead of soaring, the bird shuffled down the tree and scrambled under some rocks; the condition of the bird was beyond the average of birds of prey, large masses of fat encircling the gizzard, which on dissection was entirely empty; one of the wing-bones was broken, but whether with shot or otherwise I cannot exactly determine; the body, wings and every part of the bird exhibited the most perfect form, but probably some injury at the time prevented the bird from taking flight. The bird was sent to me in the flesh, and I had therefore a good opportunity of taking several particulars, which I will now proceed to give.

	Feet.	Inches.
Weight, 4 lbs. 1 oz.		
Extreme length	2	3
From carpal joint to the end of the longest quill-feather (5th)	1	8
Extreme width	5	5
Length of tail	0	10

Cere bright yellow; eyes large, deep hazel; beak, at the base, blue horn, the centre and tip almost black; top of the head, throat, front breast and back liver-brown; the feathers on the occiput neck in front and behind detached, ciliated and loose, with paler points. Quill-feathers abruptly narrowed by indentations of *both* webs towards their ends, which are black; inner webs towards their base, in the widest part pale brown. Secondaries brown, broadly tipped with buff-yellow, forming a conspicuous bar. Greater and lesser wing-coverts ending in distinct oval elliptic spots, gradually diminishing in size over and to the ridge of the shoulders, and appearing at the extreme margin like small drop-shaped streaks, but distinct and separate. Tail deep brown, tip much worn, but paler; upper tail-coverts broadly edged with dull yellow; the colour of the feathers next to the tail almost white. From the breast downwards to the vent a mixture of dirty yellow and brown, the centre of the feathers being yellow, with the edges all round brown; the feathers on the vent buff-yellow. Thigh-feathers buff-yellow, the upper portion striped longitudinally with dark brown, terminating in uniform dull yellow. Tarsi feathered to the feet, which are bright yellow; claws dark brown, almost black; the toes ending in four well-defined plated scales, similar in form to those of the golden eagle.

Sex, male. In the first year's plumage.

On dissection it appeared that an injury to the elbow of the wing prevented the bird from taking flight. Mr. Vingoe informs me that the flesh in this portion of the wing was like jelly, and there can be no doubt that the bird had met with a recent blow in that part; the high condition of the bird is evidence that it could not have been of long standing, but the remarkable collapsed appearance of the gizzard, without a particle of food, shows that the bird had taken no prey for a day or two. —*Edward Hearle Rodd; Penzance, December 15, 1860.*

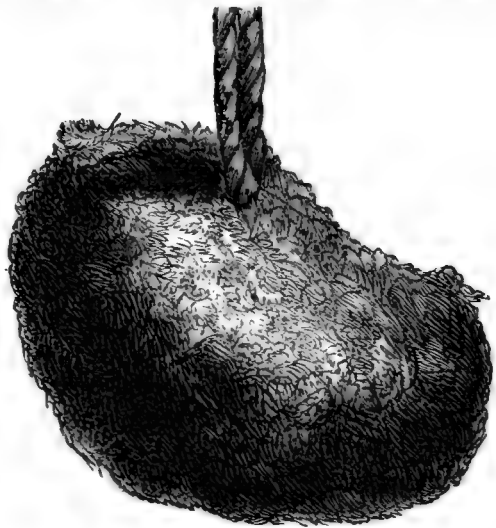
Rare Birds occurring at Weston-super-Mare.—The following uncommon birds have, within the last few years, been obtained at Weston-super-Mare, and for the most part are in the possession of Mr. Stone, a local collector:—Richardson's skua, Fulmar petrel, Iceland gull, glaucous gull, ivory gull, little gull, black tern, gray phalarope, hoopoe, quail, Bohemian waxwing, ciril buntings. —*Edmund T. Higgins; Bristol, December, 1860.*

Occurrence of the Gyrfalcon (Falco islandicus) near York.—I have now in my house a very fine specimen of the gyrfalcon, shot at a place called Upper Poppleton, a few miles from here. It was brought to my house a few hours after it was shot, and purchased by my wife for 5s. It is a young female, and I should suppose a last year's bird.—*David Graham; Market Street, York, November 20, 1860.*

The Tree Sparrow.—We have a visit of this finch under peculiar circumstances. It very sparingly occurs in Cornwall, and for a long time one instance only of its occurrence was recorded. A Norwegian brig put into this port yesterday, and amongst other articles of cargo six of the above birds were handed from the ship to a person at the quay, and they were brought to me for inspection. When the ship was mid-way between the two coasts, between the Dog-a-Bank and the Galloper Light, thousands of these little sparrows fell on board, and the master kept half a dozen merely out of curiosity. He describes the quantity of birds as an immense flock, the evidence of which appears to be conclusive from the extent of the droppings which attracted the notice of the person who made inquiries about the birds, and obtained the half-dozen brought for my inspection.—*Edward Hearle Rodd; Penzance, November 9, 1860.*

Habits and Nest of the Pichincha Humming Bird. — The Pichincha humming bird, like the Chimborazo, is found only close under the line of perpetual snow; but this species, according to the present state of our knowledge, is more widely distributed than the latter, being found not only on Pichincha, but also on Antisana and Cotopaxi. Upon my first visit to Guagua Pichincha these birds were feeding entirely on the ground, hunting the little moss-covered clumps as fast as the snow melted. They are not uncommon in this locality, but always met with singly. They are very restless, but not shy, seldom remaining on one clump more than a second, then away to another, perhaps a yard distant. Sometimes they would take a rapid flight of forty or fifty yards. On my second visit, the Chuquiragua being in flower, they were feeding from it like the Quindi of Chimborazo, but still occasionally hunted the mossy clumps. They flit with a burr of the wings, and occasionally settle, with the feathers all ruffled, on the top of the Chuquiragua or other small plant. In this respect, so far as my observations and those of Professor Jameson go, they differ from O. Chimborazo, Professor Jameson found this species building hanging nests in the lower compartment of the farm-house on Antisana." Mr. Fraser has sent home one

of these nests as found by Professor Jameson on the 2nd of November, 1858. It was attached to a rope hanging to the roof of the house, which is situated at an elevation of 13,454 feet above the sea-level. It forms a large compact mass of wool and hair, mixed with dried moss and feathers, of the curious shape portrayed in the accompanying woodcut. A little cup-shaped opening at the top forms a receptacle for the eggs, and is balanced and brought into a horizontal position by the weight of the mass on the opposite side of the rope by which it is suspended. Mr. Fraser again says, speaking of two specimens obtained



on Guagua Pichincha in June:—"From the mouth of one of these two birds a quantity of very pale yellow fluid, of a slightly sweet taste, flowed; but I did not find any in either crop or gizzard. Amongst some of those, of the same species, which I skinned the other day, I observed the same thing. If my memory serves me correctly it has occurred twice before in other species. I observed three specimens of this bird, all of a row, hanging to the bare rock (this now explains the use of those large feet and claws which the species of this group have, and which has hitherto puzzled me), like sand martins; it was under a ledge well protected from the weather, consequently well adapted by Nature for nest-building. They would fly away and then return; this was done in my sight three or four times in succession. On examining the spot, which was almost inaccessible, I found much excrement, proving to my mind that they bred in societies. My countryman, Col. Stacey, on a visit to this mountain, happened to have on a new bright yellow oil-skin cover to his wide-awake hat, and one of these birds flew round and round it for a considerable time,—as he supposes, mistaking it for a flower."—*Birds collected by Mr. Fraser in*

the Vicinity of Quito;’ by Philip Lutley Sclater, M.A. — From the ‘Proceedings of the Zoological Society of London,’ 1860, p. 80.

Note on the Nest of a Humming-bird (Thaumastura henicura) in Guatemala. — The third nest had young. It was placed in the upper shoots of a dahlia which grew at the farther end of the court-yard of the house. The hen bird seemed to have the entire duty of rearing the young, as I never once saw the male near the place; in fact, I never saw a male *Thaumastura henicura* inside the court-yard at all. When the hen was sitting she would sometimes allow me to go quite close to her, and even hold the branch still when it was swayed to and fro by the wind, without evincing the slightest alarm. But it was only when a hot sun was shining that she would allow me to do this; when it was dull or raining, four or five yards was the nearest I could approach. Frequently, when I had disturbed her, I would sit down close at hand and wait for her return; and I always noticed that, after flying past once or twice overhead, she would bring a small piece of lichen, which, after she had settled herself comfortably in her nest, she would attach to the outside. All this was done with such a confident and fearless air that she seemed to intimate, “I left my nest purely to search for this piece of lichen, and not because I was afraid of you.” When sitting upon her nest the whole cavity was quite filled by her puffed-out feathers, the wings, with the exception of their tips, being entirely concealed by the feathers of the back. When the young were first hatched they looked little, black, shapeless things, with long necks and hardly any beak. They soon, however, grew, and entirely filled the nest. I never saw the old bird sitting after the young had emerged from the eggs; she seemed to leave them alike in sun and rain. When feeding them she would stand on the edge of the nest with her body very upright. The first of these young ones flew on October 15th. It was standing on the side of the nest as I happened to approach, when it immediately flew off, but fell among the flowers below. I placed it again in the nest, but a moment after it was off again, nothing daunted by its first failure,—this second time with better success, for it flew over a wall close by, and settled on a tree on the other side. In the evening of the same day I saw the old one feeding it, and went up to the tree; but it started off with increased vigour to an orange tree, and tried at first to rest on one of the fruit, but, failing, found a more appropriate perch on the edge of a leaf. I never saw it afterwards. The other young one flew on October 17th, two days later. The proportion of males to females of my *Duenas* skins is as five to three, while of those from Coban as three to five. The seeds of the willow and bulrush are favourite materials for the interior structure of the nest of *T. henicura*, while lichen is freely used outside.—*Osbert Salvin, in the ‘Ibis,’* ii. 266.

Note on a Humming-bird (Cyanomyia cyanocephala) of Guatemala. — This last week another pair have been building somewhere near the house, and the male bird frequently comes while I am preparing skins in the corridor, and takes pieces of cotton almost from under my hand. Yesterday afternoon (August 14) Mr. Wyld caught it making a descent upon some small object in his room. He shut the window and called me. The intruder, who was wearied from fluttering against the window, suffered itself to be caught. In a very few moments its agitation ceased, and it seemed to be taking advantage of its comfortable place in my hand to rest from its fatigues, making no attempt to escape. Before letting it go I procured a piece of sugar, and dipping it in water put it to the tip of its bill. Almost immediately its long tongue was employed in sucking up the liquid. On liberating it, it flew to a tree close at hand, and seemed to take no further notice of its late captivity. If its

nest is not finished I have no doubt I shall soon see it again seeking the wool. The wind produced by the wings of these little birds is considerable, as I noticed that while hovering over a large piece of wool the whole surface of the wool was violently agitated. This same bird makes daily visits to the vases of flowers placed in the rooms.—*Osbert Salvin, in the 'Ibis,'* ii. 39.

Occurrence of the Firecrested Regulus (Regulus ignicapillus) near Penzance.—A male specimen of this *Regulus*, in fine plumage, was brought to me this week, obtained from the parish of Gulval, about a mile from Penzance. I think this species can no longer be considered rare in this neighbourhood.—*Edward Hearle Rodd; December 13, 1860.*

Late Stay of Swallows.—November 29: Saw a martin; it continued hawking for some time round the house, frequently passing within a few yards of me as it darted after the flies. I had observed one on the 24th, and my son informs me that he saw several swallows on the 1st of December. The weather had been very wet and unseasonably mild. Swallows having been occasionally noticed by myself and others in this neighbourhood during the month of December, it might readily be imagined that in a mild winter some few at least would remain with us throughout the year; but I have already recorded my opinion that this is not the case, never having observed or even heard of one from the middle of December till the middle of April,—a pretty good proof that these laggards must either wing their way to warmer climes or perish for want of food, as I cannot bring myself to believe that they would greatly suffer during a mild winter, such as is occasionally experienced here.—*H. Hadfield; Ventnor, Isle of Wight, December 3, 1860.*

Occurrence of the Little Bustard (Otis tetrax) in Norfolk.—A fine specimen of this rare visitant to our coast was killed on the 29th of November, at Norton, near Reedham. It proved to be a female, and, as usual with birds of this species when obtained in this country, was shot in a turnip field, its stomach being filled with a mass of green food.—*H. Stevenson; Norwich, December 12, 1860.*

Occurrence of the Night Heron (Nycticorax ardeola) in Norfolk.—An immature specimen of this rare species was shot about the 8th of this month, in the Caister marshes, near Yarmouth. I had the opportunity of seeing it in the flesh, and found it to be a young bird of the year, resembling the second figure in Yarrell's illustration, having the usual spotted appearance about the wings and scapulars, caused by a triangular white patch, of more or less extent, at the tip of each feather. The feathers of the head and neck are also streaked with brown and white, each feather broadly edged with brown, the quill and centre of the web being white throughout. Unfortunately, when subsequently preserved, the sex was omitted to be noted. Several of these birds have been killed in Norfolk from time to time, in both adult and immature plumage, but not of late years.—*Id.*

Large Flight of Woodcocks at the Lizard, Land's End and Scilly Districts.—We have not had such a flight of woodcocks for years as at this season. On Saturday week the Scilly steam-boat brought thirty birds, twenty-five of which were killed at Trescoe Island; the remainder were killed at the largest island of St. Mary. I have little doubt that if this island had been beaten well fifty would have been sent in addition. Yesterday, at Helston, the market town of the Lizard, the price was 2s. per brace; here the last market price yesterday was 2s. 6d.—*Edward Hearle Rodd; Penzance, November 9, 1860.*

Ostriches Breeding in Italy. — The most remarkable family in the world are now living at San Donato, near Florence, where Prince Demidoff has made admirable arrangements for entertaining them hospitably. A part of his magnificent estate has been fitted up exclusively for them. From far and near natives and foreigners come to visit them in the division of the Etablissement Zoologique appropriated to them. Mons. Des Murs is so much occupied with them that he has scarcely time to pay proper attention to two other "strang birds," the white camels, belonging to the Prince. Up to the present time the flow of visitors remains undiminished; all are desirous of paying their respects to the family of Italian ostriches. When the Parisian Acclimatisation Society succeeded in inducing a pair of ostriches to rear their young in the North of Africa, they celebrated the event with festivities; and Marshal Vaillant deemed this triumph of science of sufficient importance to warrant his forwarding minute details to the home government. The idea of introducing ostriches into Europe had not then been dreamt of. When came the authentic report that two of these gigantic birds had crept out of their shells on the banks of the Arno, the above-named Society presented their gold medal to the Etablissement Zoologique of San Donato, which Prince Demidoff liberally made over to the deserving Director. During the whole time of laying and hatching the long-legged parents conducted themselves in such a savage and hostile manner that no one ventured near their nest. A year, wisely and judiciously made use of, has rendered them so familiar and tame that, during the crisis which is just now passed, they conducted themselves with propriety, one may almost say reasonably. It was possible to approach the nest with the same serenity as one feels in going to the nest of a house swallow. With this fact before us the doubt about domesticating the ostrich falls to the ground; the giant birds belong no more solely to the menagerie; they have become European. The female began to lay on the 11th of May: with remarkable regularity she laid an egg on each alternate day. When three were laid she began to sit, during which time the number of eggs increased to thirteen. Sitting did not seem to suit the taste of the mother; she held out but a very short time. Upon her leaving the eggs the stumpy-beaked father took her place; he has, during the whole period of incubation, shown much greater zeal than the mother, who, as a rule, sat only five out of the twenty-four hours daily. The first chick appeared on the 23rd of June (the sex of the birds is undistinguishable until they come to maturity). Shortly after four more feathered Florentines appeared, when the old father lost all patience, and left the other eight eggs (each of 3 lbs. weight) to their fate. — *C. B., Wiesbaden; in the 'Field.'*

Capture of the Rednecked Phalarope (Phalaropus hyperboreus) in Norfolk. — A bird of the year of this pretty and elegant little species was shot on Thursday, the 28th of November, 1860, in Laken-heath Fen, Norfolk, from which place it was brought to Ely market, thence to Cambridge, by a dealer in game, of whom it was purchased by its fortunate possessor, J. Hamilton, Esq., of Trinity College, Cambridge, to which gentleman I am indebted for the sight of it, and the courtesy of allowing me to send this for insertion in the 'Zoologist.' This bird can be considered no other than of rare occurrence in the British Isles. In a letter to me a short time since, from J. H. Dunn, the able and well-known naturalist of the Orkneys, speaking of the rednecked phalarope, he says, "I much regret to say the species is now no more to be found in these (Orkney) Islands." This intelligence I learn with much regret as an ornithologist, and doubt not it will be so with all British naturalists who chance to peruse

this note. The phalarope is a bird to be numbered with the bustard, a bird of yore; it shuns alike the close relationship of man and the tiller's plough.—*S. P. Saville; Dover House, Union Road, Cambridge (late Jesus Terrace), December 14, 1860.*

Occurrence of the Longtailed Duck (Anas glacialis) near Tregothnan, Cornwall.—A fine, well-conditioned specimen of this rare duck (in these parts) was sent yesterday for preservation. The early appearance of this arctic duck seems to forebode hard weather in the North. I have never known but one other specimen of this duck before in this neighbourhood, and that was in nearly the same state of plumage as the present, without the long tail-feathers, the upper parts more or less umber-brown, with a similar patch on each side of the neck.—*Edward Hearle Rodd; Penzance, November 10, 1860.*

The Little Gull (Larus minutus) shot at Eastbourne, Sussex.—On Thursday, the 6th of December, 1860, a fisherman, residing here shot a pretty specimen of this gull, which I saw in the flesh and examined. Unfortunately it did not come into my possession. It weighed nearly four ounces, measured $11\frac{1}{2}$ inches, and from tip to tip of extended wings nearly 26 inches.—*John Dutton; South Street, Eastbourne, December 17, 1860.*

Breeding of a Penguin called the Rock-hopper (Aptenodytes chrysocome) in the Falkland Islands.—The Falkland Islands' rock-hopper (so called from its jumping from rock to rock) comes up from the sea about the middle of October, and lays the first week in November. Like the other penguins, they return to the same breeding-grounds. These are situated on high cliffy slopes near the sea, and with a fresh-water stream running near, in which the birds constantly wash themselves. They are also, like the gentoos, continually going to and returning from the salt water. The space occupied by some of the breeding-places is nearly 500 yards long by about 50 broad, and their eggs lie so close together that it is almost impossible to walk through without breaking some of them. I have often wondered, on disturbing these birds and driving them away from their eggs, how, on their return, they would pick out their own among so many hundreds. Yet this they do, walking back straight to their eggs, and getting them between their legs with the utmost care, fixing them in the bare space between the feathers in the centre of the lower part of their belly, and gradually lowering themselves till their breasts touch the ground, the male bird of each pair standing upright alongside of the female.—'Ibis,' ii. 337.

Rare Fishes occurring at Weston-super-Mare.—Amongst a host of other small fry the following fish have been obtained by me since the end of June, from the shrimp and other nets, at Weston-super-Mare, in the Bristol Channel:—

White Goby (*Gobius albus*). One specimen. Two other gobies, differing from those figured in Yarrell's 'History of British Fishes,' one probably *Gobius auratus*.

Argentine (*Scopelus Humboldtii*). Seven specimens.

Clupea macrocephala, Swainson. One specimen.

Long Flounder (*Platessa elongata*). Two specimens.

Anglesea Morris (*Leptocephalus Morrisii*). Four specimens.

———? (*Leptocephalus?* ———?). One specimen. This differs in so many respects from the Anglesea Morris that further examination will, I think, prove it to be a distinct species.

Lampern (*Petromyzon fluviatilis*). One specimen. Included in this list because not generally supposed to visit, at any season, the salt water. — Edward T. Higgins; 101, Kingsdown Parade, Bristol, November 27, 1860.

The new British Physa. — The announcement (Zool. 7278) of a *Physa* new to the British fauna will be received with interest by many readers of the 'Zoologist.' But they will probably agree with me that certain points in Mr. Choules's statement demand further elucidation before the species can fairly take rank as a Briton. From the days of Turton and Montagu the fresh-water Mollusca have received so much attention, and the species, with one or two exceptions, are so well known and generally distributed, that the fact of one having been overlooked might be regarded as well nigh impossible. I am not aware that any addition has been made to them since Dr. Harvey found *Amphipeplea involuta*; or Mr. Bean, *Pisidium cinereum*. Moreover, when we consider the number of West-Indian species which have been enumerated as British, and then rejected on irrefragable evidence, we cannot but fear that Mr. Choules's *Physa* may share their fate. After all, there appears to be a degree of uncertainty as to the species he has found. According to Forbes and Hanley, vol. iv. pp. 143, 144, the *Physa rivalis* of Maton and the *Physa acuta* of D'Orbigny and Draparnaud are distinct, the former being West Indian and the latter European. Both have already been described as British, and rejected as spurious. To which of them are we to refer Mr. Choules's mollusk? Again, the habitat in Kew Gardens must be regarded with suspicion. It is true that the extreme delicacy of the *Physa* would render it unlikely that it has been introduced with water-plants from a foreign country; still it is possible that such might be the case, and in our ignorance of the locality where Mr. Choules at first collected his specimens we are at liberty to conjecture that they may have originally found their way to both stations from accidental causes. Would it not be desirable to entrust the secret of their whereabouts to one or other of our eminent conchologists? If Mr. Jeffreys, or Mr. Norman, or Mr. Woodward, were to investigate the spot, and declare the shell to be British, it would be universally accepted as such, and prove a highly interesting addition to our fauna. I think we might venture to promise Mr. Choules that none of these gentlemen would extirpate the race. Once more: will not some readers of the 'Zoologist' apprehend that this shell may, after all, prove an extreme form of our *Physa fontinalis*? I am unacquainted with either of the foreign species in question, but can verify the observation of Forbes and Hanley, vol. iv. p. 142, that British varieties of *Physa fontinalis* "differ as much from the typical form as many of the supposed species of *Physæ* do from each other." It appears also that a confined area, like the tank in Kew Gardens, has a tendency to affect the growth of these shells, and in particular to develop their spire to an unusual extent. Far be it from me to throw discredit on Mr. Choules's discovery. Having myself paid some attention to our fresh-water Mollusca, I am ready to admit that they possess a mysterious faculty of finding their way to unlikely habitations. Every naturalist can cite examples of *Dreissena polymorpha* turning up profusely in waters where it had hitherto been unknown, and whither its progress could not be traced. I have myself collected a dozen species of shells in a pond at North Stanley, near Ripon, which is at least half a mile from any other water. Two of these

species, *Lymneus stagnalis* and *Cyclas caliculata*, do not, to the best of my belief, occur elsewhere in the neighbourhood. *Lymneus glaber*, a rather rare shell, is plentiful in one or two small horse-ponds at Ingleby Greenhow, but except in these I never found a single specimen, though I tried every pond and ditch in the surrounding neighbourhood. Under these circumstances it would be unwise to doubt the fact of Mr. Choules having discovered *Physa rivalis*, though we may reasonably wish to have one or two points in its history cleared up before acknowledging it as one of our truly indigenous Mollusca.—*James Dalton ; Church Broughton, Derby.*

Curious Annelids at Ashburton.—Being at Dartmoor, with my son, last July, we made Ashburton the centre of our explorations. Among many other matters of interest a curious phenomenon occurred just at the entrance of the town. A quarter of a mile or so from the houses there is a shallow horse-pond, the bottom of which consists of an impalpable mud, much indented with hoof-holes and other irregularities. In these, the water being dimly clear from settlement, we observed what looked exactly like blood, in numerous patches, the appearance being as if two or three drops of blood had fallen in one spot, half a dozen in another, and so on. The colour was true; and even when we alighted, and looked carefully on the spots, they had just that curdled appearance that drops of blood assume when they fall into still water. But there appeared on minute examination a constant intestine motion in each spot, which caused me to bring my eye closer, when I discovered that I had been egregiously deceived. Each apparent drop of blood was formed of a number of slender worms—about as thick as a hog's bristle, and an inch and a half long—of a red hue, which protruded the greater part of their length from the mud, in a radiating form, each maintaining a constant undulatory movement. There were more or fewer centres of radiation, the circles frequently interrupted by and merging into others, just as drops of blood crowded together would do. On the slightest disturbance the little actors shrank out of sight into the soft mud; but by scooping up a little of this I contrived to get a number of them into a phial, which, as the sediment settled, were seen at the bottom, playing as if in their pond. On examination of specimens with a microscope I found them to be minute annelids, such as I have described, apparently of the genus *Lumbriculus* of Grube, with two rows of bristle-pencils and two bristles in a pencil. The body was transparent and colourless, and the red hue was given by the great and conspicuous longitudinal blood-vessels, and by the lateral connecting vessels, which viewed sidewise took the form of loops. The animals soon died in captivity, but I kept some for three or four days.—*P. H. Gosse ; Sandhurst, Torquay.*

Notes on certain Crustacea observed Abroad.

By ARTHUR ADAMS, Esq., F.L.S.

On the Habits of Eriocheir japonicus.—If we do not illustrate the habits of our crab, I am determined the crab shall throw some

light upon our proceedings. Eriocheir, defunct and desiccated, shall transport us in imagination to scenes that will linger long in the memory.

On the banks of the Yang-tsze-kiang are tracts of low swampy land haunted by curlews, snipe and plover, where water-buffaloes, attended by groups of noisy Mima-birds, alternately ruminates and wallow in the mire, and which are irreclaimable even by the patient industry of the Chinese husbandman. Scattered over these swampy plains are certain sedgy pools. The bottom is soft mud, and the water, though it looks black, is very clear. The reed, the Iris and the bullrush grow in the water, and fringe the peaty margin. Over their emerald swords and spears often hangs the little bluebacked kingfisher, and up to his knees in water stands watchfully the snow-white padi-bird. *Certes*, there are fish in these said ponds, and the waters are peopled with noisy frogs. Some portions of the adjoining ground are pierced like a cullender, and the holes are the work of the crab with a bloody hand (*Pachysoma hæmatocheir* of De Haan), but as yet there is no trace of he of the hairy hand.

As in England boys take possession of ponds, moorlands and commons, and disport themselves therein, robbing the humble-bee, stoning frogs and troubling the mind of the gamekeeper, so do the urchins of the Flowery Land resort to these oozy pools for profit and recreation. With an artfully-fashioned wicker-basket, narrow at the top and sloping at the sides, the pig-tailed boy advances cautiously into the yielding mud, probes with his toes the overhanging banks, or plunges both his arms beneath the spongy roots. Anon a "something" is adroitly transferred to the basket hung about his neck, which "something" on examination turns out *Eriocheir japonicus*. He is a crab dark olive and freckled, flat-backed and apathetic, by no means nimble on his pins, nor aggressive with his hirsute claws. Placed on the ground, he shambles along sideways towards the water, never moving in an inland direction, and, when possible, speedily makes himself invisible beneath the soft, black mud. He is rightly placed between *Trichopus* and *Utica*, and belongs to the fresh-water members of the *Grapsus* family. Strolling through the unsavoury purlieus of the village of Woosung, I notice in all the fish-shops long strings of these crabs, which, from their abundance in the market, seem to be admired articles of diet among the poorer Chinese. For half a mace I purchase two strings, each of nine full-grown *Eriocheirs*.

When I again make the acquaintance of our hairy-handed friend I am in that paradise-island, Tsu-Sima. We watered ship in the bight

of one of the numerous deep inlets which everywhere indent the outline of the island. From the summit of the Oo-i-yama, the loftiest mountain, runs a tortuous stream; now deep, winding and narrow; now wider, and leaping over great flat stones, forming little waterfalls; and finally spreading out into a shallow, stony watercourse, as it rushes down to meet the waters of the bay. Here are tempting pools with trout for the angler, and stony ledges crowded with *Neritinae*; while under the loose, flat stones, half-buried in the sandy mud, lurks *Eriocheir japonicus*.

Again we meet in Manchuria, and the manner of our meeting is in this wise. We join a "pic-nic" to the Lake. There is Wilford of the "seven-league boots," vasculum on back, intent on plants; there is Buckley, fishing-rod in hand, eager for salmon; Sutherland, thoughtful, caring for beetles; and the Doctor, renewing his youth in the fellowship of that gay band. At length, fatigued with our several exertions, for even pleasure sometimes becomes a toil, we lie supine upon the sand, under the shade of the hazels that fringe the margin of the Lake. One prepares the soothing pipe; another, prone over the water, takes huge horse-like draughts of the limpid element; and as sailors ashore must always light a fire, the others collect little sticks for the inside and larger boughs for the outside. A spark is produced in a bunch of dried grass, which is waved in the air till a blaze is created, and the fire is then kindled.

A fire with nothing to cook is bad, so we cast about for something to eat. There are no birds to shoot, although there is a fowling-piece; the fishes will not allow themselves to be caught, and for beetles we have no appetite. But crabs there are for the seeking. So bare-legged we wade, and in the shallows of the fresh-water Lake we capture these desirable Crustaceans, which are no other than *Eriocheir japonicus*. No sooner is a specimen taken than he is cast upon the glowing embers. Biscuit we have, and wild onions grow in the sand around; but "the salt" of course is forgotten. No boatswain's pipe assails our ears, no "bear a hand" is heard. The noise and bustle of the ship is clean forgotten in the calm of nature. Solemn silence reigns upon the Lake; solemn silence reigns in the great oak woods. Serene and undisturbed, in that wild spot we thankfully cook our crabs, and enjoy our frugal meal.

On the rapid Growth of Cirripedes.—The following short note will tend to illustrate the rapid growth of the pedunculated Cirripedes. In 1857 the 'Actæon' sailed from Rio de Janeiro, towing the 'Dove,'

her little steam tender, by two 9-inch hemp hawsers. On the 31st of March we both arrived at the Cape of Good Hope, having been six weeks on the voyage. On our arrival at the Cape the hawsers, which were quite new on starting, were hauled inboard, when they were found covered with barnacles along their whole length. These were nearly all full-grown, and, with the exception of one small white *Balanus*, were all pedunculated, belonging to the genera *Lepas*, *Scalpellum* and *Otion*. So numerous were they that even when the hawsers were comparatively freed from them they became so offensive, from decaying animal matter, as to require to be washed with Sir W. Burnett's solution, and kept on deck a considerable time before they could be reeled up below.

ARTHUR ADAMS.

Cossus ligniperda in Scotland. — I am so far behind in my knowledge of Scottish Lepidoptera as to be ignorant whether or not the goat-moth has been recorded as a native of Scotland. When in the district of Strath Summet, last September, I lighted upon a well-grown larva of this insect under the bark of a larch log. No perforations of the wood were to be seen, the creature having fed apparently on the inner bark. When observed it had constructed a kind of form, as if intending it for winter quarters. Two or three days afterwards a second larva was picked up crawling upon a wall about a mile and a half distant from the locality of the first specimen. One of them, I see, is still alive; the other is at present out of sight.—*Robert Hislop; Blair-lodge, Falkirk, November 24, 1860.*

Description of the Larva of Epione vespertaria.—The egg is hatched in May. The larva is very lively: when disturbed it falls in the net and feigns death. Varies much in colour when young. When full fed the head is larger than the 2nd segment. Body elongate and twig-like. Colour of the head dark brown; of the body pale reddish brown, with four fine white dorsal lines to the 6th segment; the 6th segment much enlarged, and having a large pale dorsal blotch, with dusky centre, two black dorsal spots and one large lateral black spot, in the centre of which there is a white ring with black centre; upon all the segments, from the 7th to the 13th inclusive, there is a series of lemon-coloured diamond-shaped blotches with dusky centres, and becoming less distinct as they approach the 13th segment; a subdorsal black and white spot on each segment from the 5th to the 13th inclusive; a pale pinkish lateral stripe and a distinct lateral spot on the 11th, 12th and 13th segments. Feeds on *Salix phylacifolia* (dwarf willow), and is full fed about the first week in July, when it changes to a very lively pupa among the leaves of its food-plant.—*W. Prest; 7, Castlegate, York.*

Another Description of the Larva of Epione vespertaria.—The larvæ mentioned in the 'Intelligencer' (vol. viii. p. 82) produced, as I anticipated, *Epione vespertaria*. The first (male) imago emerged on the 15th of August, and a succession of males and females (the latter, though rarely captured at large, preponderating) continued to appear until the beginning of September,—about a month later than the period of their appearance at large last year. Very few have this year been taken, though their usual

haunt was industriously searched. "With no protuberances" is scarcely correct as to this larva; there is an enlargement of the 5th or 6th segment, the segments anterior to which are of less diameter than those posterior to the enlargement. This gives the larva somewhat the appearance of having a long neck; the enlargement is rendered more prominent by having on it two conspicuous black spots, one on each side. In colour the larvæ vary somewhat when full grown, some being nearly black, whilst others are of a purplish gray, beautifully marbled or mottled at the sides, a paler chain-like mark running along the back. When disturbed the larva drops suddenly, and lies motionless, as though dead, coiled up somewhat in the shape of a fish-hook. The plant upon which the larvæ were found and fed up it would have been more accurate to have called dwarf willow than dwarf sallow; I am not sure, though I believe it is called *Salix phylicæfolia* (tea-leaved willow).—*J. Birks; York, October 8, 1860.*

[I have cited the second description from the 'Intelligencer,' because there is a slight discrepancy between the two.—*Edward Newman.*]

Description of the Larva of Eupithecia pumilata: Green Variety.—Ground-colour yellowish green, almost primrose-yellow. Central dorsal line olive, intersecting and uniting a series of pear-shaped spots of the same colour, the latter becoming merged in the central line on the anterior and posterior segments. Subdorsal lines olive, two on each side. Belly pale dirty green, with dusky edges. The spots and lines vary much in intensity of colouring, and are sometimes almost entirely wanting, leaving the larva a uniform pale yellowish green. Feeds on *Clematis Vitalba*, &c.—*H. Harpur Crewe; Drayton-Beauchamp Rectory, November 29, 1860.*

Description of the Larva of Campptogramma bilineata.—Yellowish green. Central dorsal line dark green, becoming faint on the anterior segments. Subdorsal lines yellowish white, faint. Segmental divisions yellow. Spiracular line yellowish white, waved. Back suffused with white, studded with small white tubercles and short hairs. Belly deeper green than back, traversed longitudinally by numerous slender yellow lines, and occasionally spotted on each segment with two large dusky purple spots. When young the ground-colour is sometimes reddish drab. Hybernates small, and begins to feed at the beginning of March, on dock, chickweed, &c. Full fed in April. Pupa enclosed in a slight earthen cocoon. Thorax and wing-cases dark olive, the latter rather paler and transparent at the edges. Abdomen mahogany-red.—*Id.*

Description of the Larva of Herminia barbalis.—Pale reddish brown, rather transparent. Central dorsal line blackish. Whole of back marbled indistinctly with dark rusty red, and studded with minute dusky spots. On each side a row of slanting dusky stripes. Head dusky red. In appearance resembles in many respects the larvæ of the *Satyridæ* and *Hesperidæ*. My larvæ were beaten in September, from birch and oak, and did not feed afterwards; they hybernated till March and April, when they fed for about a week on the outer cuticle of the bark of whitethorn and gooseberry. The pupa is enclosed in a slight cocoon of silk and gnawed bark; it is rather long and slender. Thorax and wing-cases deep red, suffused with black. Abdomen rich red, with a black central dorsal line. Ventral junction of wing-cases slightly blackish. Abdominal divisions black. The perfect insect appeared in about a month.—*Id.*

Description of the Larva of Ellopiia fuscifaria.—Ground-colour gray. Down the centre of the back a series of ochreous-red blotches, intersected by a central line paler than the ground-colour. Each dorsal segment, with the exception of the anterior ones, ornamented with four reddish tubercles, one pair much smaller than the other.

On each side a row of slanting white streaks, forming the subdorsal lines. Belly whitish, with two or three brown dots on each segment. Feeds on *Pinus sylvestris*, in March, April and May. Full fed the latter month. Pupa in an earthen cocoon. Uniform bright yellowish red. Centre of wing-cases rather darker than rest of the body. Abdomen tapering. Antennæ strongly marked in serrated lines. Abdominal divisions blackish. Lively; when touched has a peculiar quivering motion.—*H. Harpur Crewe.*

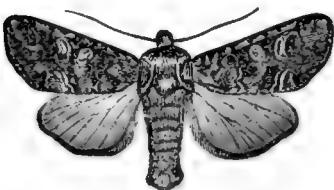
Description of the Larva of Xylina rhizolita.—Ground-colour pale bluish green. Central dorsal line white, slender, interrupted and very indistinct. Subdorsal lines yellowish white. Central dorsal line bordered on each segment by two white tubercles. Back and sides marbled with white, spotted minutely with white specks and tubercles, and sparingly strewed with white hairs. Belly smooth. Head green. Feeds on oak. Full fed middle of July. Pupa red, in a rather closely-spun earthen cocoon.—*Id.*

Description of the Larva of Cidaria prunata.—Long, tapering gradually towards the head. Ground-colour greenish gray. Down the centre of the back a series of purplish pyramid-shaped or triangular blotches darker at the sides, and becoming much curtailed in size on the anterior and posterior segments. On each dorsal segment four small white tubercles. Post-capital segment slightly enlarged and encircled by a black or purplish collar. Belly more or less marbled with dusky purple. Central ventral line interrupted, purplish, edged with yellow. Belly and sides studded with white tubercles. Bred from eggs laid in August; hatched the end of March and beginning of April. Fed on gooseberry. Full fed the middle of May. Pupa enclosed in a very slight web between leaves, long, thin, and tapering very considerably towards the abdominal tip. Ground-colour yellowish gray. Thorax much curtailed, bordered with purplish black. Central dorsal line distinct, purplish black, crossed on the thorax by two short transverse lines of the same colour. Wing-cases and abdomen spotted and streaked with purplish black. Central ventral line purplish black, broader on the abdomen than between wing-cases.—*Id.*

Description of the Larva of Larentia multistrigaria.—Ground-colour pinkish or yellowish gray. Central dorsal line blackish. Subdorsal line slender and indistinct, pale purplish brown, thicker at the segmental divisions. Spiracles and spiracular line purplish. Between the latter and the subdorsal line a waved yellowish line, with dusky edges. Segmental divisions pinkish. Belly flesh-coloured. Central ventral line broad, yellowish, having on each side a row of purplish spots. Back and belly more or less minutely spotted with purplish brown. These larvæ were reared from eggs kindly sent me by Messrs. Cooper and Holyday. They fed on *Galium aparine*. *Galium saxatile* is, I believe, the proper food-plant, but of this I had none at hand. They were full fed from the beginning to middle of June. Pupa red, in a slight earthen cocoon.—*Id.*

Occurrence of Dianthœcia capsophila in Ireland.

When collecting on the coast near Dublin, last July, I took several specimens of a *Noctua* which puzzled me. I judged it to be a variety of a common species, but have lately ascertained from Mr. Doubleday that it is *Dianthœcia capsophila*, an alpine species, and rare on the Continent. This species is intermediate between *Dianthœcia carpophaga*



and *D. capsincola*, and about the size of the former. — *C. G. Barrett*; *Dublin, November 20, 1860.*

Determination of Philonthus prolixus, a Brachelytron new to the British Fauna.— I have within the last few days determined a Brachelytrous insect, which, if I am not mistaken, is new to our fauna.

PHILONTHUS PROLIXUS, *Er.*

It is most nearly allied to *P. procerulus*, *Grav.*, and is easily distinguished from *P. signaticornis* by the antennæ not being pale at the apex; from *P. villosulus* by the antennæ not being entirely pale. It belongs to Erichson's 8th section, with the sides of the thorax thickly punctate, and differs from *P. procerulus* in being rather larger and broader. The antennæ are considerably longer, and darker towards the apex. The head is more oblong. The elytra are considerably wider, both absolutely and in proportion to the thorax: they are more distinctly and sparingly punctate, and instead of having merely the apical margins rufo-testaceous this colour extends for a considerable distance along them, in one of my specimens even beyond the middle, gradually passing into a dark piceous. I have taken three specimens at Cowley, all in July, one of them in 1858, the other two the present summer. I have also seen one specimen in the possession of my friend Mr. Rye. — *John A. Power*; 52, *Burton Crescent, November 19, 1860.*

Capture of Mycetophagus 4-guttatus. — During the present week I have been fortunate enough to capture seventeen specimens of the rare *Mycetophagus 4-guttatus*, *Müller*, of which I believe very few examples are known. They were lurking in a heap of old pea-haulm, and had manifestly been bred there, for one of them is perfectly immature, and had not attained its proper markings. I have no doubt that more might have been taken; but it was such bitterly cold work handling the wet haulm, that after a hunt of about an hour and a half I was quite beaten, and glad to give up the search.—*Id.*

Beetling at the Cape and in Java. By ARTHUR ADAMS, Esq., F.L.S.

Beetle Hunting at the Cape.—We were at the Cape during the whole of the month of April, and we found the weather fine but somewhat stormy. As you wish to know what sport there is for the coleopterist at the Cape I have much pleasure in sketching for you my experience of three insect days.

On landing almost the first beetle you see is *Trogosita mauritanica*, in passing through the dockyard, which is brought over in the sugar-bags from the Mauritius. We just look in at Mrs. Green's to drink a glass of ale and chaff the dusky maids, and having purchased some grapes of Rachel, the pretty fruiterer, we sally forth rejoicing.

This first day we are fascinated by the flowers on the glorious Simonsberg, and plunge at once among the Proteas, where, in company

with the honeysuckers, we discover a store of beetles. In nearly every half-blown blossom we find buried a large green *Cetonia*, and on proceeding to dissect the flowers we discover at least six other genera, according to the state of the floral envelopes and receptacle. On the leaves of the silver tree and on the various heaths we obtain some *Coccinellæ* and *Chilocori*. On this day we make the acquaintance chiefly of the birds, especially of the crow with the white collar, and of the noisy butcher bird. We pick up a small tortoise, and see with a shudder the fatal black form of the sluggish Cape Cobra glide slowly beneath an old root.

Another day and ground beetles are our game. We select the loose stones at the foot of the mountains, where, in hot and sandy places, we take some *Anthiæ*, some fine large black species and some smaller white-spotted ones. Here also we find *Opatrums* and other *Heteromera*; and in the kloffs and gullies and ravines, in the humid neighbourhood of streams and watercourses, *Chlænii*, *Harpali* and *Carabi* turn up and reward our patient assiduity. The Caffir herdsman regards us on this sultry day with especial wonder, for while he watches his buffaloes browse, crouched motionless under the shadiest bush he can find, lo! we are toiling in the sun, turning over stones, and after all finding nothing to eat! The stragglers we met with in this day's cruise are some *Cucujus*-like customers and *Anobiums*, under the bark of a hollow tree near the pretty cottage on the hill-side, where we gather delicious mushrooms, we secure a *Colymbetes* in a cattle pond, detect a *Lagria* and a *Copris* promenading a sheep-walk, and by the sides of the sandy road, which is much used by buffaloes, a large black *Ateuchus* is observed shoving along balls of dung with his crooked hind legs.

On the third day we are bound for Miller's Point, along the coast, and our venture is carrion beetles. We pursue an uneven course, up sand hills and down sand dales, until a boulder covered with the trailing stems of the yellow *Mesembryanthemum* arrests our eye. The green carpet is torn off from the surface of the stone. Out run the *Staphs*, and down drop the scorpions, while the nimble yellow centipedes vanish mysteriously with that unpleasant wriggling motion peculiar to *Myriapods* and *Ophidians*.

About two miles to the left of Simon's town we cross a plain, where the grass struggles for existence with the sand, and where the round green gourds of the *Colocynth* rest upon the ground, like shot strewn the surface of a battle-field; a thousand foot-prints of horses stamped in the moist sand (for the ground is used for breaking in horses)

heightens the resemblance. On a sudden a taint in the pure air offends our nostrils, but we know it, and, like the vulture to his carrion meal, we are led by the nose to the carcase of a sheep. Placing our "nobility" to windward we capsize the defunct mutton, and Necrophori, Histers and Dermestes reward the bold adventure.

We are now, after walking some little distance, close to Miller's Point, and approach the great flat wild-looking rocks where they haul up captured or stranded whales by chains and windlasses and strip the bones off the flesh and blubber. All around are stray fragments of the mighty fish-like mammals, and turning over a dorsal vertebra (with effort, for it is a large bone) perchance we secure a Silpha, or by a delicate investigation of an unsavoury fathom of "baleen" we possibly appropriate a Ceryon or a Catops.

On our return we descend the sand hills near the sea, and by the "ancient and fish-like smell" we become aware of the vicinity of a station of cleaning and drying fish. We raise a casual board, and behold! the under side is alive with Brachini about an inch long, numbers of them exploding in a most bombardier-like manner, while others are making themselves scarce as fast as their six legs can carry them. The vapour of this large species is very acrid, and leaves a permanent yellow stain on the fingers.

Occurrence of Prognatha in Java. — Now that Staphs, once much abused and shamefully neglected, are become fashionable among beetles, I know I shall be commended if I record the capture of a species of Prognatha (a very singular genus of a very singular group) in the forests of Java, under precisely similar circumstances as those attending the capture of *P. quadricornis* in England.

In that dear country from which, alas! I have been these four years banished, I remember taking the insect in the good old days when Dr. Power, E. Shepherd, my brother Henry and myself used to trespass on the pheasant preserves and haunt the green bye-lanes of Southern Hampshire, not without exciting suspicion in the minds of certain gentry in velveteen shooting-coats that we were either vagrants, poachers or incendiaries. Seated on the trunk of a noble elm whose head had recently submitted to the axe, we idly peel off the Scolytus-eaten bark, where, lying "perdu," we discover Prognatha quadricornis. By the way, should my observations anent Prognatha or any other "small beast" be considered neither very succinct nor much to the point, but, on the contrary, extremely rambling and incoherent, the failing I would suggest might charitably be ascribed to a sailor's proverbial love of "spinning long yarns."

To return, however, to Java, if not to Proguatha. We are watering at Mew Bay, near the entrance to the Straits of Sunda. A beautiful little cascade falls down a rock into the sea, under the cool shade of dark-leaved trees, where the water-casks are filled without let or hindrance. There is a legend among the sailors of a rhinoceros having charged a party watering here some time previously, which exciting incident, if ever it occurred, lends an additional charm to the spot in the eyes of these danger-loving sons of the sea. In sober truth the ground is literally ploughed up by the tracks of these huge unwieldy Pachyderms.

Instead of landing at the watering-place we prefer making a little *détour* through the forest, at no great distance from the shore. Dead, hoary, lichen-covered, fern-tufted trunks lie prostrate in our path, and great, green, orchid-hung branches overshadow the snow-white coral strand which gleams below. Our progress at first is slow and difficult, but as we go we hunt. The first fallen tree we turn over discovers a slender green snake with a turned-up pointed nose, and which said Ophidian, being active and vigilant, very naturally makes his escape. The next fern-grown trunk exhibits two ugly black scorpions, of a formidable size, affectionately coiled round a numerous progeny. With cautious care, for we suspect their venom to be potent, we pass a running noose round their knotted tails, and secure the parents of this interesting brood by suspending them to a convenient twig. As for the little ones it is a second "Massacre of the Innocents;" every tender scorpion is mercilessly butchered. And talking of scorpions reminds me that I have at times induced "parties" to believe I possessed the power of taming these most antipathetical Arachnidans and their equally respected Myriapodous relatives, the Centipedes. The black art of the mystery-man, however, simply consists in surreptitiously snipping off the tip of Scorpio's sting and the hooks of fell Scolopendra's jaws with a pair of scissors. Deprived of the power to penetrate the skin, these noxious insects are then permitted to enjoy undisturbed a ramble over the face and hands of the exhibitor. At Pratas' Island, however, the conjuror himself is actually stung by a small scorpion, and he calculates the pain to be about equal to the sting of an irate British wasp, with which of course he has been acquainted both as man and boy. Next we come to a promising dead tree covered with Boleti, eating which we find Mycetophagi of goodly size, and of a black and red pattern.

Stripping off a portion of the loose and partially detached bark, out runs a little dusky, splay-footed, flat-bellied gecko, who is instantly

made a prisoner, not, however, without the loss of his tail; a couple of yellow centipedes follow his example, drop on the ground, and vanish in a most desperate hurry; numerous small Juli are coiled up in the rotten wood, and under damp close-laid masses of bark are the flattened bodies of the *Prognathæ*; they are deep chesnut-brown, and somewhat larger than the European species. Small trickling rivulets permeate the undergrowth in this wild jungle-corner of Java. Stooping down to take a drink at one of these (for the thermometer here stands at 90° in the shade) I start. Robinson Crusoe when he saw the "print of a man's foot in the sand" could not have been more completely taken aback. Under my very nose the fresh impress of a tiger's paw is manifest. My outspread hand just covers it. Aware, however, of the crepuscular habits of these cat-like monsters I am speedily reassured, and the presence of some long-spined *Melaniæ* in the stream diverts my attention from this ominous trace of the much-dreaded man-slayer. Two villages in the immediate neighbourhood are deserted, having been recently desolated by tigers.

Among the foliage of the trees *Nanina citrina* is discovered, and under the *débris* and dead twigs a fine spotted species of *Pythia* (*P. pantherina* of A. Adams) is found, while pretty silver-marked *Cassidæ* alight on the sunlit blades of horizontal leaves, and, without ceasing, the loud grating noise of *Cicadæ* vibrates through the wilderness.

And here I really must relate a ludicrous incident that happened to my friend B——. Anxious to explore the tiger-haunted precincts of one of the deserted villages, he is confronted on his way by a stream. Nothing daunted, however, he plunges in and swims to the opposite bank. Here he finds a smouldering wood fire, which he gaily replenishes, and then hangs up his dripping "inexpressibles" on a stick to dry. In his now somewhat primitive costume he then proceeds to examine with the eye of a hunter the tracks of rhinoceros and other "*feræ Naturæ*," which, he states, do greatly abound there. Having satisfied even *his* curiosity, our young friend goes of course to the bank of the stream to reclaim his nether habiliments. Alas! nothing but a burnt shred is visible. No choice remains but to make his way back through the difficult jungle, defiant of scratches, insensible to thorns, and eventually to present himself on board, an object of astonishment to his beloved messmates.

ARTHUR ADAMS.

Note on Dinarda Maerkelii, &c.—In June and August of this year I was considerably gratified by the discovery of *Dinarda Maerkelii*, in the nests of the wood-ant, in the neighbourhood of Killiekrankie. At the later date the insect was emerging from its pupa. In the same nests were found *Homolota flavipes* and *H. anceps*, *Thiasophila* ——? *Leptacinus Formicetorum*, *Dendrophilus pygmæus*, *Euplectus Karstenii*; and in the same wood, under leaves, *Myrmedonia humeralis*. Some smaller Brachelytrous creatures also occurred, but they require further investigation. —*Robert Hislop; Blairlodge, Falkirk, November 24, 1860.*

A few Observations on Cynips Lignicola and C. Radicis.

By FREDERICK SMITH, Esq.

IN the year 1857 I felt desirous of satisfying myself as far as possible, by my own observations, of the truth of the opinion at that time put forth, by more than one eminent entomologist, that in the genus *Cynips* there is only one form of sex; in other words, that in the genus *Cynips* there is *no male!*

In order to carry out my experiments, I obtained from Devonshire a large supply of the galls of *C. Lignicola*, somewhere about a bushel and a half; every gall was tenanted by the *Cynips*, or its parasite *Callimome devoniensis*. About the beginning of April, 1858, the *Cynips* began to issue from the galls, and continued to do so up to the end of May, at which time I could not have obtained less than twelve thousand examples, and many hundreds of its parasite.

By examining the galls daily during the progress of the development of the flies, I was enabled to examine the whole of the latter, and to satisfy myself that all of this immense number were females. I also placed about sixty galls in as many separate boxes, and when the *Cynips* came out I carried them to different localities in the vicinity of London, placing them upon low oaks in woods and hedges. In the month of August I revisited the various localities, and in about eight cases out of twelve I found galls formed upon the very trees on which I had placed the *Cynips*, but none in their vicinity. From these galls I again obtained the *Cynips*, and this brood I also placed in isolated situations; and again I found galls formed in about the same proportion as in the previous instance. In neither of these cases could there have been any connexion with the male sex, unless that sex be of microscopic dimensions.

In 1859, and also during the present season, I have obtained a number of galls of the gregarious species, *Cynips Radicis* of Fabricius; this gall is sometimes as much as two inches in diameter, and

contains an immense host of individuals. From galls of this description I obtained about twelve hundred flies, all of which I have carefully examined, and am satisfied that all are of the female sex.

On several occasions I have bred numbers of *Cynips aptera*, but, as in the preceding cases, all proved to be females.

I do not know whether any one has distinguished the sexes of *Acari*; I have failed to do so; and it has appeared to me, in one instance at least, that there is apparently no distinction of sex: I am led to imagine, judging from what I have observed, that the species might be perpetuated for ever without, so far as I can see, any intervention of a male sex. In 1853 I obtained a large supply of the larva of *Anthophora Acervorum*; these I placed upon a bed of wool in a flat box; the majority of the larvæ were in the earthen cells formed by the bee. In the autumn a few changed to pupæ, then to perfect insects; the rest passed the winter in the larva state. On the return of spring I examined the contents of the box; all were in the larva state; but to my mortification numbers were attacked by a species of *Acarus*: this species is described by Newport in the 'Linnean Transactions,' where an account of its habits is given at length. The *Acarus* is of small size, and has a globular, semi-transparent abdomen, rather smaller than a mustard-seed; the thorax is short, and has attached to it a number of apparently useless legs, for the head of the creature is buried in the body of the bee-larva, which, as far as has been observed, it never quits, but remains in a stationary position during life, feeding upon the body of the bee-larva; when it arrives at a state of maturity it dies, still attached to the larva. Nothing now is left of its victim but a dried, shrivelled skin; all motion ceases on the part of the *Acarus*, when the swollen abdomen bursts, scattering atoms of dust on everything around it, these atoms being in fact the eggs of the *Acarus*. Not less than forty *Acari* attack a single bee-larva. A small portion of this dust, sprinkled upon a larva, invariably produces the *Acarus* in a few days' time. Some of this powder which still remained in a few of the earthen cells which I had by me last year, it being six years since I obtained it, produced the *Acarus* when sprinkled on the larva of *Anthophora*. Now, although I have examined these *Acari* repeatedly under the microscope when feeding, I have never observed the slightest difference amongst them in form or otherwise; all were, apparently, permanently attached to the bee-larva from the time of their birth to the time of their death. By what process the eggs are fertilized I am at a loss to conjecture. Apparently the only mode whereby eggs become fertilized in the body of

the female is by copulation of the sexes ; but is it not possible that some other mode may exist? Every observation which has been made on the genus *Cynips* is against the possibility of the existence of an active male ; it is proved that females, which could not have been fertilized by copulation, deposit eggs which are fruitful.

Leon Dufour has reared *Cynips* by thousands from different species of galls. Hartig has obtained twenty-eight species of *Cynips*, all females, from different kinds of galls ; in one case, that of *Cynips divisa*, at least 10,000 females, and about 4000 of *Cynips Folii* : he has also observed the female *Cynips* issue from the gall, and immediately proceed to deposit her eggs. In fact, all observation, as I have already observed, is opposed to the existence of an active male in the genus *Cynips*. I may also add that during the past autumn I have bred numbers of *Cynips Folii* from the cherry-gall of the oak-leaf, all being females.

I do not profess to have made any notable discoveries during the various investigations which I have prosecuted during the last three years ; all that I have done is to confirm the observations of others, and to remove from my own mind an impression that there must have been some mistaken observation on the part of those who arrived at the conclusion that *Cynips* has no male ; but instead of discovering any inaccuracy of observation, or anything to confirm the doubts I had before making my experiments, I have ended by adopting the opinion which I deemed so incredible.

As far as I am aware, there appears to be an absolute necessity for eggs being fertilized by some process or other, in order to perpetuate the species. If this be the case, the question arises,—In what way are the eggs of *Cynips* rendered fruitful? in what manner is this effected? Can it be a possibility that spermatozoids are engendered in the body of the female *Cynips*, and the eggs fertilized before oviposition? This will doubtless appear to be an extravagant, nay even a wild theoretical idea ; but if fertilization is necessary, then it appears to me that it must be effected by some process with which, in the insect world at least, I am not acquainted. If this be not the case, still I must confess that I see at present, judging from the evidence before me, no other conclusion at which I can arrive than that *Cynips* has no male.

In the course of my observations on the breeding of *Cynips* from galls there appears to be established a fact with which I was not previously acquainted, namely, that *Cynips* has a cynipidous parasite, in the same way that we find nest-building bees intruded upon by what

have been called cuckoo-bees, that is to say, bees which do not build nests, and deposit their eggs in the nests and upon the food stored up by their more industrious brethren; thus I find that the gall formed by *Cynips Lignicola* occasionally produces a species of *Decatoma*, but I do not know whether the same gall produces the *Cynips* also; hundreds of the larvæ of *Cynips Lignicola* are preyed upon by its parasite, *Callimome devoniensis*.

Cynips Radicis has two cynipidous parasites; one a species of the genus *Rhodites* of Hartig; the other I have not determined. Of the cynipidous parasites it must be borne in mind that both sexes are developed in the ordinary numbers which we observe in cuckoo-bees; this species has also a chalcididous parasite which destroys its larva namely, *Callimome Cynipidis*.

FREDERICK SMITH.

December, 1860.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

December 3, 1860.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘*Nouveaux Mémoires de la Société Impériale des Naturalistes de Moscou*,’ Tomes xi., xii. and xiii. ‘*Bulletin de la Société Impériale des Naturalistes de Moscou*,’ 1859, Parts 2, 3 and 4; 1860, Part 1; presented by the Society. ‘*Bibliotheca Historico-Naturalis*,’ Vol. x. Part 1; by the Author, E. Zuckold, Esq. ‘*Tijdschrift voor Entomologie*,’ Vol. iii. Parts 4, 5 and 6; by the Entomological Society of the Netherlands. ‘*Stettiner Entomologische Zeitung*,’ Vol. xxi. Nos. 10, 11 and 12; by the Entomological Society of Stettin. ‘*Journal of the ‘Proceedings of the Linnean Society*,’ Vol. v. No. 18; by the Society. ‘*The Entomologist’s Weekly Intelligencer*,’ Vol. viii., and Nos. 205—217; by the Editor. ‘*The Zoologist*’ for December; by the Editor. ‘*Mein Aufenthalt auf Taiti*;’ ‘*Reise von Shanghai bis Sidney*;’ ‘*Beitrag zur Fauna Dalmatien’s*;’ ‘*Ueber die ersten Stände von Plinthus Megerlei*, Pz.’; ‘*Mein Aufenthalt in Rio Janeiro*;’ ‘*Beitrag zur Insectengeschichte*;’ ‘*Ueber einen bisher verkaunten Laufkäfer, beschrieben von L. Miller: und einen neuen augenlosen Russelkäfer, beschrieben von F. Schmidt: ferner einige von Schmidt in Schischka neu entdeckte Höhlenthiere*;’ ‘*Beobacklungen über die Entwicklungsgeschichte der Chionea araneoides von Dr. J. Egger und G. Frauenfeld, nebst Anatomie des Insectes und der Larve von Dr. F. Brauer*;’ ‘*Ueber die Sommerbeschäftigung eines Theiles der Bewohner des Wienerwaldes, St. Paul*,’ Parts 1 & 2; ‘*Bericht des Henn Custosadjuncten G. Frauenfeld über den Erfolg der ihm gewordenen Mission die Weltumsegelungs-expedition S.M. fregate ‘Novara’ als Zoologe zu begleiten*;’ ‘*Ausflug nach dem Adamspik auf Ceylon*;’ ‘*Notizen über die Fauna Hongkong’s und Schanghai’s*;’ ‘*Notizen gesammelt während meines aufenthaltes auf Neuholland, Neuseeland, und*

Taiti; presented by G. Frauenfeld. 'The Journal of the Society of Arts' for November; by the Society. 'The Athenæum' for November; by the Editor. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' by Francis Walker, F.L.S., &c., Part 21, Geometrites (continued); by the Author.

Election of a Member.

Mons. Henri de Bouvouloir, of No. 15, Rue de l'Université, Paris, was balloted for and elected a Member of the Society.

The President announced that Mr. W. W. Saunders had kindly undertaken to receive the subscriptions from members of the Entomological Society of France resident in this country, and that the 'Annales' of that Society would be forwarded to him, and be delivered to members so paying, at his office, No. 13, Copthall Court, London.

Exhibitions.

Mr. Stevens exhibited some Coleoptera sent from Ceram by Mr. Wallace, including *Euchirus longimanus*, *Monohammus Grayii*, and other fine species.

Mr. King exhibited a singular variety of *Campptogramma bilineata*, and two specimens of *Leucania putrescens* taken near Torquay.

The Rev. A. R. Hogan exhibited specimens of *Niphargus Kochianus*, *Spence Bate*, a species of well-shrimp discovered by him, along with two other new species, at Ringwood, in the New Forest. They were afterwards found in several other places, those before the Meeting being from Upper Clatford, near Andover. One of the most remarkable facts connected with *Niphargi* was their occurrence in recently-sunk wells; they have in more than one instance been drawn up in large numbers by pumps not two years's sunk. Their organization is of a very high character, but most of the species, both in this country and on the Continent, are destitute of eyes. When in captivity the movements of these Crustacea are exceedingly interesting, being graceful and active, as well as peculiar; but there is great difficulty in keeping them alive for any length of time, owing to their sensitiveness to temperature; a very cold atmosphere at once deprives them of life. The limbs are also very fragile; so that it is difficult to transmit them with safety by post. The size of the largest species as yet found in England, *N. fontanus*, reaches about half an inch. A description of the British *Niphargi* and of their habits was made public in the 'Natural History Review and Quarterly Journal of Science' for 1859, in papers by C. Spence Bate, Esq., and the Rev. A. R. Hogan; and a more complete account will be given in the British Museum 'Catalogue of Crustacea,' now in the press.

Mr. Hogan also exhibited a female specimen of *Chirocephalus diaphanus*, taken at Shaftesbury, in Dorsetshire, last summer, furnishing a new locality for one of our largest and most beautiful fresh-water Crustaceans.

Mr. Lubbock said he was very glad to see some exhibitions which were a little out of the ordinary course. Both the animals now exhibited by Mr. Hogan appeared to be very local. He had himself some time ago brought to a meeting of the Society some blind shrimps from a well at Brighton, and some specimens of *Chirocephalus diaphanus* from a pond in Kent, between Bromley and Sevenoaks. He believed that the present was the most northern locality in which this beautiful and interesting Crustacean had hitherto been found.

Mr. Lubbock then exhibited some specimens of *Campodea Staphylinus*, *Westw.*,

which he at first supposed to be Neuropterous larvæ. They were found under slices of turnip which had been placed as a trap for Myriapods.

Mr. Lubbock also exhibited some specimens of *Sphærolaria Bombi*, a parasite of the humble-bee, which was first discovered by M. Leon Dufour, and subsequently observed by Siebold. Mr. Lubbock stated that he had himself found these parasites in the females of every species of *Bombus* which he had examined. As the mature form of this parasite only is known, he was very anxious to obtain some *Bombi* during the winter, in order to determine, if possible, the process of development, and to throw some light on the manner in which the young parasites effect an entrance into their victims: he should therefore be much obliged to those entomologists who would forward to him any hibernating *Bombi* which might be found while searching for insects during the winter months.

Mr. Westwood exhibited a singularly pale variety of *Alcis repandata*, taken by Mr. Daubeny, of Magdalen College, Oxford, the markings forming a link between the typical insect and the variety named "conversaria" by Hübner, the subapical strigæ being very acutely undulated, and preceded by a large, nearly black patch.

Mr. Westwood observed that his attention had recently been drawn to a specimen of *Eristalis similis*, Meig., presented to the Hopeian collection in Mr. Well's cabinet of British insects, in which the head is entirely enveloped in the thin, semitransparent pellicle forming the true pupa-skin; the upper part of the head being, moreover, surmounted by the transverse lunate piece of the indurated head-covering of the larva, through which the two horns of the so-called pupa had been protruded. This lunate piece is represented by Réaumur (Mém. iv. pl. 33, fig. 6, d, d); and as, in looking at the head from the front, the open space between the upper part of the pellicle and the lunate piece is seen to be traversed by two internal prolongations of the horns, extending to the pellicle itself, it seemed not improbable that these two horns are the antenna-cases.

Mr. Westwood further directed attention to the statement made by Mr. Curtis, that the death's-head moth, on emerging from the chrysalis, has its legs enveloped in thin pellicles, subsequently cast off; and suggested whether this pellicle was not analogous to the thin skin cast by the May flies after their first flight, and which appears equally to be identical with the thin pellicle covering the bodies of the pupæ of coarctate Diptera, such as that of the *Eristalis* mentioned above. Monsters of this kind are of great rarity, a *Noctua* described by Müller ('Naturforscher,' St. xiv. pl. 4, figs. 1—3), and a butterfly, *Nymphalis Populi*, figured by Wesmæel (Bull. Acad. Bruxelles, t. iv. No. 8), being the only recorded instances. A *Dysticus*, however, in Mr. Bowering's collection, and an Emperor moth in Mr. Stephens's cabinet in the British Museum, also agree with the preceding, retaining, in the perfect state, the head-covering of the larva.

Mr. Waterhouse exhibited two species of *Donacia* which he had compared with the *Leptura aquatica* and *L. sericea* of the Linnean collection. The latter is the *Donacia sericea* of modern authors; the *L. aquatica* of Linnæus differs in being a rather shorter and stouter insect. In *D. sericea* the thorax is broadest in front, and considerably contracted behind the middle; the anterior angles are as prominent as the lateral hump or swelling which lies immediately behind them. In *L. aquatica* the thorax is rather shorter, nearly quadrate, less contracted behind; the anterior angles are not so prominent as the lateral hump, and this hump is rather smaller; the surface of the thorax is more rugulose, and the dorsal impression is more distinct. In

D. sericea the third joint of the antennæ is elongate-obconic, and decidedly longer than the second; whilst in *L. aquatica* the third joint of the antennæ is short-obconic, and very little exceeds the second in length. In both sexes the antennæ are longer in *D. sericea* than in *L. aquatica*; the legs are also rather longer. In *L. aquatica* the tooth to the hind femora is stouter, and the joints of the tarsi are shorter and broader. Such are the differences which present themselves upon comparing the insect exhibited to the Society, as being similar to the *L. aquatica* of the Linnean collection, with the *Donacia sericea*. Mr. Waterhouse could not say whether these differences are all of them constant. The specimen exhibited was taken at Rannoch, in Perthshire.

Mr. Waterhouse observed that since the last Meeting he had examined certain *Cassidæ* in the Linnean collection which might be referred to British species. They were:—

1. *Cassida viridis*. This is not, as has by many been supposed, the *C. equestris*, but is the species commonly found by us on thistles, having acute posterior angles to the thorax, and punctate striæ to the elytra. = *C. rubiginosa* of Bohemann.

2. *C. nebulosa* = *C. nebulosa* of Bohem.

3. *C. Murræa* = *C. murræa* of Bohem. The rufous-brown variety.

4. *C. maculata* = *C. murræa* of Bohem. The green variety.

5. *C. nobilis* = *C. obsoleta* of Bohem. Has the margins of the elytra reflexed, the alternate interstices of the striæ of the elytra slightly raised, and the region of the scutellum depressed.

6. *Cassida Vibex* = *C. nobilis* of Bohem. The specimen is apparently discoloured; the whole dorsal surface of the elytra is darkish brown, if we except the second interstice, which is pale, and which no doubt, in the living insect, was occupied by the bright green stripe; the dark colour occupying the first interstice and the 3rd and 4th interstices of the striæ, but stopping considerably short of the apex; the remaining upper parts are paler: the under parts are black, the sides of the abdomen rather narrowly edged, and the apex very narrowly edged with pale. The thighs are black, excepting at the apex, and the tibiæ and tarsi are piceo-testaceous (the anterior tibiæ piceous), which is unusual. The expanded margins of the elytra are deflexed. Mr. Waterhouse considered that this must have been the *C. nobilis* of the 'Fauna Suecica,' and does not really represent that described by Linneus under the same name.

Mr. Rye exhibited a specimen of *Choleva spadicea* found in a fungus at Coombe Wood.

Dr. Knaggs exhibited some eggs of a Lepidopterous insect from which small Hymenopterous parasites, apparently a species of *Mymar*, had emerged; and some eggs of *Sesia bembeciformis* found deposited on a willow-leaf.

Mr. Stevens exhibited some small Staphylinidæ recently found in moss, including *Evcesthetus scaber*, *Acidota cruentatus*, *Stenus fuscicornis*? and *Syntomium æneum*.

Mr. Waterhouse read a paper intituled "Notes on the Species of *Triplax* of Stephens's 'Illustrations' and Collection."—*E. S.*

PROPOSED TO BE PUBLISHED EARLY IN 1861.

PRICE 1s. MONTHLY.

THE BRITISH BOTANIST,

A NEW MONTHLY JOURNAL,

INTENDED CHIEFLY FOR

RECORDS IN BRITISH BOTANY,

DESCRIPTIVE, CRITICAL, AND TOPOGRAPHICAL.

THE want of a good botanical periodical, as an organ of intercommunication with and between all true Botanists, who devote their attention chiefly to the plants of their own island, has been much felt for some time past. This want has been felt more and more each succeeding year since 1854, the date to which the original *Phytologist* was continued.

It is believed that the time has now arrived, when an effort ought to be made to supply this want, by the establishment of an improved monthly journal, at the same price of one shilling; taking rather higher scientific ground than the original *Phytologist*, but without sacrificing what was really good in the plan of that once popular periodical, formerly found so serviceable to the progress of Botany in this country, and so useful in cherishing a taste for correct botanical knowledge.

While it is clearly seen that a journal of British Botany should be open to the contributions of all observers of nature,—the lady or gentleman amateur equally as the more technical man of science;—it is thought that such a journal may, at the same time, be so

conducted that strictly scientific Botanists shall not feel it a disparagement of themselves to have their names enrolled among the Contributors.

The views of several of the leading British Botanists, in reference to this undertaking, have been inquired during the past year. It has been ascertained that many of the best qualified Botanists are quite willing to give their assistance. But as arrangements cannot be made for commencing the projected publication simultaneously with the new year of 1861, it has appeared desirable to issue this preliminary announcement of what is in contemplation, with a hope of thereby further ascertaining to what extent such an improved journal would be supported by the general public of Botanists in this country. Intimations of intended support are earnestly requested from all well-wishers.

Copies of this announcement will be sent to all British Botanists whose post-addresses are certainly known to the Promoters. The exact addresses of many being imperfectly known, it is requested that those who may receive them will kindly spread the copies to others;—also, that those who shall fail to receive them direct, will rightly attribute the omission to unintentional mischance, or a want of sufficient certainty about the proper address.

Advice or suggestions will be thankfully received from any, and duly considered. Mr. Newman having been requested to become the Printer of the proposed journal, letters may at present be addressed to the "*Editor of the British Botanist—care of Mr. Newman—9, Devonshire Street—Bishopsgate Street—London, N.E.*"

DECEMBER 1, 1860.

Death of the old Lion at the Zoological Gardens, Regent's Park.—I regret to have to record the death of a large and very valuable animal. Mr. Bartlett, Resident Superintendent of the Zoological Gardens, kindly sent me notice that the old patriarch lion, who has so long been an ornament to the carnivora-house and the admiration of visitors, had died very suddenly; and at the same time he invited me to be present at the examination of the body. It appears that the lion was quite well on Saturday night last, and ate his food heartily as usual; but when the keeper came on Sunday morning, behold! the poor beast extended full length, dead and stiff upon the straw, having apparently died without a struggle. Alas! poor lion. On arriving at the Gardens on Monday morning I found that the skin had been removed, which I much regretted, as a dead lion forms an admirable and rarely-to-be-met-with study for artists. However, having hauled the huge skinless carcass upon a table, in company with a few scientific medical gentlemen, we carefully searched for the cause of death, and found that both lungs were exceedingly congested, and almost impervious to air. We also ascertained that there was some appearance of congestion about the base of the brain; and the verdict was death from congestion of the lungs, caused probably by the excessive cold. Dr. Crisp, who was present, remarked how curious it was that all the cat tribe are so rapidly affected by the cold, and that in a few hours they fall victims to its effects.—*F. T. Buckland, in the 'Field' of December 29, 1860.*

Notes on the Fauna of Shetland. By W. D. CROTCH, Esq.

HAVING spent the months of August and September in Unst, the most northern of the Shetland Isles, I am tempted to give some record of observations and captures made during that period; incorporating much information liberally afforded me by my kind friend and host Dr. Edmonston, who is too well known to zoological science to bear panegyric from me. However, the present list, especially as regards the Entomology, is most meagre; this is in part owing to the ungenial character of the past summer, but I hope in the following spring to make great additions.

The Mammalia of Shetland are few in number, viz. :—

Lutra vulgaris. Common, affecting especially the sea coast.

Phoca vitulina. Numerous, though shy from recent persecution.

P. barbata. This fine species is sadly diminished in numbers, and not more than one or two pairs now remain in their old haunts at Burrafirth.

Mus sylvaticus, M. musculus and *M. decumanus.* The latter has not, apparently, spread beyond Lerwick, from the absence of piers, by which its landing in these islands might be effected from the various vessels.

Lepus timidus. On the mainland only.

L. cuniculus. Common. All that I observed near Balta Sound had a small white star in the centre of the forehead.

Equus Caballus. These hardy little fellows were probably imported from Norway, and are introduced here to call attention to a singular fact in their economy, which is, that during the winter, when grass is scarce, they resort to the shore and eat the sea-weed; at the same time the capacity of the stomach is much reduced, and the whole viscus contracted to half its ordinary size. It is needless to add that at this time they are incapable of work. An analogous instance of the adaptability of the stomach is given in reference to *Larus argentatus*.

Bos Taurus. Shetland cattle have also a strange peculiarity of diet, feeding freely on the young of what are called "sillocks," when, as is often the case, they are caught in quantities far greater than sufficient for human consumption.

Phocæna communis. Locally called "nisack" or "sprite." Can this *soubriquet* have arisen from its propensity for *gobbling* the herrings?

P. Orca. This species is addicted to astonishing small craft by its sudden appearance alongside, of which habit we had ocular demonstration.

P. melas. The caain' or driving whale continues to exercise its suicidal vocation at intervals, and to the great benefit of the fishermen; but we were not so fortunate as to witness any instance.

Monodon monoceros. I know of no recent examples.

Physeter Tursio. Probably the species indicated by the term "finner," from the prominence of its dorsal fin.

Balæna mysticetus. Of rare occurrence.

Balænoptera Boops. This also is a "finner," and of frequent occurrence.

An arctic fox was also lately an involuntary denizen of the mainland; but, a price having been set on his head, his existence there came to a rapid end, but not before he had shown a most natural appreciation of Shetland mutton.

The species of birds are numerous; principally, however, as seasonal or occasional visitants. Some stress has been laid on the fact that since the introduction of shrubs into some of the gardens of this treeless region several of the smaller insessorial birds have appeared; but though their stay in the islands might be influenced by these

additions to the native flora, yet their first visits must have been caused either by migratory instinct or stress of weather, and in many instances doubtless the former influence was at work. I have, when far distant from land, observed various finches flying seaward in the teeth of a strong breeze, and this not at any definite period of migration. By this vagrant impulse only can I account for the occurrence of such birds as the hoopoe, rosecoloured pastor and turtle dove, in the most northern of the Shetland Isles, and in the beginning of autumn.

Falco chrysaëtos. Occasional, now rarely seen.

F. albicilla. Permanent. Eyries still exist on the Noss Hermaness, Rona's Hill, Graveland and Fetlar.

F. haliaëtus and *F. islandicus.* Occasional.

F. peregrinus. Permanent.

F. subbuteo. Summer.

F. æsalon. Permanent.

F. tinnunculus. Permanent. This and other members of the hawk tribe are locally designated "maalin."

F. palumbarius. Occasional.

F. nisus. Permanent.

F. milvus. Occasional.

F. buteo and *F. æruginosus.* Winter.

F. cyaneus. Permanent.

Strix bubo. Occasional.

S. brachyotus. Occasional. Though this species breeds in Orkney, I have not heard of its doing so in Shetland.

S. flammea. Occasional.

S. aluco. Occasional in summer.

S. nyctæa. Formerly breeding in Unst, but now a rare visitor. Mr. Gatherer, of Lerwick, kindly gave me the head and foot of one of these fine birds which had drifted ashore in a decayed state. The local name is "katyogle" or "haarfang."

S. passerina? Occasional. Should not this be *S. Tengmalmi*, which is the northern species, *S. passerina* not occurring, according to Temminck, above 55 deg. N. lat.?

Turdus viscivorus, *T. pilaris*, *T. iliacus* and *T. musicus.* Occasional.

T. merula. Permanent, at least *in intention*; the cats, however, usually interfere with this arrangement, the only shelter being in gardens attached to dwellings.

T. torquatus. Occasional.

Sylvia rubecula. Winter. Can this untimely appearance be

accounted for by the comparative mildness of Shetland winters, or this bird's well-known tolerance of cold?

S. œnanthe. Summer. This is, if not the most numerous, at least the most certain of notice among Shetland birds, as it may be seen at every step. It is almost always called the "stonechat."

S. trochilus. Occasional, summer.

S. rufa? Some little doubt exists as to this species.

S. atricapilla. Occasional, summer.

Regulus cristatus. Occasional, winter, spring and autumn.

Parus major and *P. cæruleus*. Occasional, winter.

Bombycilla garrula. Occasional, autumn.

Motacilla Yarellii. Summer; annually migratory. This bird has of late become a regular summer visitant.

M. flava. Occasional, summer.

Anthus pratensis. Annually migratory. Appearing in small flocks in summer.

A. obscurus. Permanent. Most abundant. Commonly called "teeteck."

Alauda arvensis. Permanent.

Emberiza nivalis. Annually migratory. This year we shot specimens as early as September 19th. The local name is "snawfool."

E. miliaria. Permanent, with accessions from October to April.

E. citrinella. Occasional.

Fringilla cœlebs. Annually migratory. Both sexes appear in autumn, and some occasionally remain in winter.

F. montifringilla. Winter.

F. domestica. Permanent.

F. chloris. Winter.

F. spinus. Occasional, winter.

F. cannabina. Permanent?

F. linaria. Occasional.

F. montium. Permanent. This, the "lintie," is the commonest linnet, occurring in all the valleys.

Loxia curvirostra. Occasional, summer. Several specimens remained some time at Halligarth, Dr. Edmonston's residence, but fell at length before the unceasing wiles of a cat, who, by the way, has slain more rare species than her progeny could be worth for ever!

Sturnus vulgaris. Permanent and abundant.

Pastor roseus. H. Saxby, Esq., had the good fortune to shoot a young male of this species at Halligarth during our stay. On dissection I found the stomach filled with fragments of *Geotrupes putridarius*.

Corvus corax. Permanent. A deadly enemy to lambs and ponies. Attacking them when on the low diet which winter affords, we slew fifteen, which had the effect of rendering them more wary, but not, apparently, less numerous.

C. corone. Occasional, summer. Rarely seen.

C. cornix (hoodie). Permanent. Common, bold and handsome, but decidedly mischievous.

C. frugilegus. Occasional, spring.

C. monedula and *C. glandarius*. Occasional.

Picus martius. A specimen was killed at Belmont, in Unst. I heard also of another species said not to be *P. major*, but like it, which as yet I am unable to trace.

Troglodytes europæus. Permanent.

Upupa Epops. Occasional, summer. One rose before me in the dusk, and set my thoughts wandering among unknown woodpeckers, which a long chase and frequent glimpses did not then dispel, as the bird had an unaccountable facility for scaling the stone walls or "dykes" which adorn the country in all directions; however, the morning disclosed the species in the same field or "park," to which, when disturbed, it always returned, with a wavering flight like that of *Arge Galathea*, which indeed it much resembled. It seemed most at home on the ground, always keeping close to the "dykes."

Cuculus canorus. Occasional, summer.

Coracias garrula. Occasional.

Hirundo rustica and *H. urbica*. Breed occasionally.

Cypselus apus and *Caprimulgus europæus*. Occasional.

Columba livia. Permanent and numerous.

C. turtur. I shot one at a snap shot, in mistake for a hawk, while dashing over the garden wall at Halligarth, September 9th. I believe this is the second example of its occurrence in Shetland.

Glareola torquata. Not since 1812.

Charadrius pluvialis. Permanent. In flights of many thousands in autumn, but many migrate. These birds descend to the valleys at dusk, when they may be easily approached and shot if the sportsman can see them, which, however, is only practicable when they rise, and this they are averse to do, preferring to run, uttering all the while their plaintive cry, close at hand but totally invisible.

C. hiaticula. Permanent.

Vanellus melanogaster. Occasional.

V. cristatus. Permanent, and on the increase, a pair or two only being the stock a few years since; now there are several respectable flights.

Strepsilas interpres. Permanent?—it seems now only seen occasionally in summer.

Calidris arenaria. Occasional, autumn.

Hæmatopus ostralegus. Permanent.

Grus cinerea. Occasional, under stress of weather.

Ardea cinerea. Occasional, but often seen; we saw two.

A. minuta. Dr. Edmonston saw an example of this species, a few years since, in winter.

A. stellaris. Occasional, autumn and winter.

Ciconia alba. Has occurred twice.

Platalea leucorodia. Has been shot and seen in winter.

Numenius arquata. Permanent. Not common in Unst.

N. phæopus. Permanent. Oftener heard than seen.

Totanus calidris. Occasional, and not numerous.

T. hypoleucos. Summer. We saw specimens, but at that time I was not aware that this species was not known to visit Shetland, and consequently none were shot.

T. glottis. Occasional, summer.

Recurvirostra avocetta. One seen by Dr. Edmonston.

Himatopus melanopterus. Likewise seen by the Doctor, who is not so inhospitable to strangers as ever to desire to kill them merely because they arrive but seldom.

Limosa rufa. Occasional.

Scolopax rusticola. Once shot on Balta Island. Surely it must occur more frequently.

S. gallinago. Permanent, and very numerous.

S. gallinula. Annually migratory, winter.

Tringa subarquata. We shot three specimens of this pretty species. Its mode of tripping rather than running is very elegant. The stomachs contained the larvæ of beetles.

T. Canutus. Summer; annually migratory. Possibly this bird breeds in Shetland, but we did not see them till September.

T. minuta. Occasional, autumn. We saw and shot them in company with the curlew sandpipers, far from the shore. They were very tame, and allowed approach and observation.

T. variabilis. Permanent. All the *Tringas* are called locally "plover pages."

T. maritima. Spring.

Gallinula crex. Summer; annually migratory.

Fulica atra. Rare on the lochs.

Phalaropus platyrinchus. Autumn. We shot one, which my

cousin supposed to be an oddly-marked dunlin; he fired and the bird rose, but seeing me dropped on a sheet of water, and commenced swimming: after admiring it for some time we provoked it to fly, when I shot it.

Anser ferus and *A. segetum*. Winter.

A. albifrons. Occasional, winter.

A. leucopsis. Winter.

A. brenta. Winter. The "Horra goose," from Horra Sound, where it is very numerous.

Cygnus musicus. Winter.

Anas tadorna. Occasional.

A. acuta. Winter. Not uncommon.

A. boschas. Permanent.

A. querquedula. Summer, occasional.

A. crecca. Permanent. I shot several in August, in capital condition.

A. Penelope. Winter.

A. mollissima. A few remain to breed.

A. spectabilis, *A. fusca* and *A. perspicillata*. Occasional.

A. ferina. Winter.

A. marila. I have this species recorded as occurring in summer occasionally, but I doubt its breeding in Shetland.

A. fuligula. This species also appears to have occurred in summer.

A. glacialis (calloo). The duck of Shetland, occurring in large flocks on the numerous voes or inlets.

A. clangula. Winter, but it is supposed that some remain during summer.

Mergus serrator. Permanent and plentiful, but shy.

M. merganser. Autumn; breeding in Orkney, if not in Shetland.

Podiceps cornutus. Winter and spring. Rare.

P. minor. Winter.

Colymbus glacialis. Winter, and sometimes permanent.

C. arcticus. Has become very rare.

C. septentrionalis (rain goose). Permanent, but much diminished in numbers.

Uria troile (longie) and *U. Brunnichii*. Permanent.

U. lacrymans. Guillemots with the bridle mark occur, which, I suppose, are to be called *U. lacrymans*.

U. grylle (tyrtie). Permanent. The whiter plumage was assumed this year by October, but not quite universally.

U. alle. Winter.

Mormon fratercula (tammy-norie). Summer. Permanent? Very few remain after the breeding season; and there appears reason to believe that some other species or well-marked variety exists which appears in winter.

Alca torda (willock). Summer.

Carbo cormoranus (loring) and *C. cristatus* (scarf). Permanent.

Sula bassana. Occasional, but tolerably common after the breeding season.

Sterna arctica (piccatarie). Summer.

Larus Rossii? A gull, the plumage of which was tinged with rose-colour, was shot some years since in North Unst; possibly it belonged to this species.

L. ridibundus. Summer.

L. tridactylus (weeg). Summer and autumn, in millions.

L. eburneus. Winter. Sent to the Edinburgh Museum, by Dr. Edmonston, in 1822.

L. canus. Permanent.

L. leucopterus. Winter. This bird, which bears the same relation to *L. glaucus* as *L. fuscus* to *L. marinus*, was first noticed in Britain by Dr. Edmonston, and is still to be seen in Shetland, though there is no reason to suppose that it remains to breed.

L. fuscus (said-fool). Permanent.

L. argentatus (white maa). Permanent. To exemplify the relative value of morphological and anatomical characters, it may be mentioned that the digestive organs of this bird during the summer, when its food is fish and animal matter, are membranous; but in early spring, when their diet is almost wholly of some description of corn, they are provided with an adequate gizzard, quite sufficient, were that organ alone in view, to locate its owner among the Gallinaceæ; Let this habit become permanent, and a very pretty specimen of mutation would be the result.

L. marinus (baagy). Permanent.

L. glaucus. Winter. Dr. Edmonston, who first noticed this species, formerly observed large flocks where now a chance specimen only can be seen.

Lestris catarractes (skua or bonxy). Summer. A few years since, some greedy itinerant collector shot down all the specimens of this fine species, except a pair or two, which their boldness during the breeding-season rendered an easy matter. It is a pity he was not made to smart for it on the occasion; but as these birds have, by the appointment of a keeper, been increased in numbers, though at

great expense, I am authorized to state that future visitors to Hermoreness will not be allowed to wantonly destroy these birds.

L. Richardsons (shooy). Summer. We obtained specimens in all states of plumage, from the kestrel-marked young to the white-breasted and ringed adult; but there were differences which it would be premature to allude to at present, pointing apparently to some distinction of species. On dissection the old birds were found to be filled with heath-berries, but the young had fed on fish.

Procellaria glacialis. Occasional.

Puffinus Anglorum (leirie). Summer. Breeds in rabbit-burrows and crevices.

Thalassidroma pelagica (speney). Permanent. We saw one on an inland piece of water, towards evening, as if about to roost, which, unless the bird was injured, seems strange.

On reviewing this list we find 36 permanent species, and about 16 summer and 25 winter regular visitors; in all 158, to which a few may still be added.

W. D. CROTCH.

[I cannot allow this paper to appear in the 'Zoologist' without expressing my regret that my correspondent should take no notice of the admirable and very careful 'Fauna of Shetland,' published in previous numbers of the 'Zoologist' (Zool. 459, &c.), by the late lamented Mr. Thomas Edmonston. Mr. Edmonston's long residence in Shetland, his zeal and knowledge as a naturalist, and his untimely fate, all combine in demanding this tribute to his memory.—*Edward Newman.*]

Occurrence of the Waxwing (Bombycilla garrula) in Banffshire.—I have just had brought me a very fine specimen of this pretty bird, and very uncertain visitant here. It was obtained on New Year's Day, at Gardenstown, in the parish of Gamrie. Eleven years ago one was procured in the same locality, though under very dissimilar circumstances, the present one having been shot; the other came down a chimney. See Zool. 5267.—*Thomas Edward; Banff, January 5, 1861.*

[The occurrence of the waxwing has been mentioned twice or thrice lately in the 'Field' newspaper, but not in a way that I can venture to quote.—*Edward Newman.*]

On the Occurrence of American Birds in Europe.

By Herr H. GÄTKE.*

THE route by which American birds proceed to Europe is, as Yarrell justly terms it, "an interesting problem, of difficult solution." For years this solution has occupied my attention; and although I have myself always been convinced that such of these entirely American birds as occasionally visit Europe *do* reach us by a passage across the Atlantic, this remains a mere opinion, carrying no weight if unsupported by facts, or by at least sufficient argument to make good the question at issue.

The mere comparative review of the occasional visitors among the birds of Great Britain and of Germany will lead to the conclusion that the route of American birds to Europe must needs be a voyage across the Atlantic, for almost all the additions to the birds of Europe, of species purely American, have been obtained in Great Britain, which could not have been the case if they had proceeded in any other than an eastern direction; whilst the additions by Germany, furnished to the European Ornis, consist nearly entirely of birds belonging to Asia.

However striking the result of such a comparative review may be, one question will always present itself, namely, whether it be possible for a bird to sustain an uninterrupted flight sufficient to carry it across the wide expanse of the Atlantic. I am convinced that this is possible, and shall endeavour to prove such possibility.

This purpose necessitates a measure for the rate of locomotion of a bird through the atmosphere. For a long time I vainly endeavoured to obtain reliable data upon which to found an estimation of the rate of flight of birds, when at last I hit upon a passage in Yarrell's 'British Birds,' ii. p. 295, where, speaking of the carrier pigeon, he mentions the fact of one of these birds having performed a flight of 150 miles in an hour and a half: it was on the 24th of June, 1833; the pigeon flew from Rouen to Ghent; sixteen others flew the same distance in two hours and a half.

Wonderful as this instance of swiftness of the flight of a bird may appear, it certainly is still surpassed by birds when on their periodical migrations; for the above feat was accomplished by an individual hatched and reared in at least semi-confinement, whose powers of flight consequently could not be nearly so well developed as in a bird

* As translated in the 'Proceedings of the Zoological Society' for 1860, p. 105.

grown up wild and free, which nearly every hour of his life has to depend on the utility of his wings, either for the purpose of overtaking his prey, or for that of escaping from being caught.

Laying down, therefore, 100 geographical miles per hour as the rate of flight of birds during distant migration, one keeps—after the above—quite within safe bounds; and, at this rate, the 1600 geographical miles from Newfoundland to Ireland would be effected in sixteen hours. No ornithologist will doubt for a moment the capability of a healthy bird to sustain a flight of that duration; during the long summer days many of the Hirundinidæ are on the wing for as long a period, and although their flight may be interrupted by occasional rests of very short duration, it is performed in the lower, less buoyant atmosphere, and consists of so many evolutions that most decidedly it must on the whole be much more tiresome than the straight path, in the pure upper regions, of a bird bent on the performance of one long pilgrimage.

Even supposing that birds become exhausted before accomplishing the passage across the ocean, observations I have made in the vicinity of this island have fully convinced me that small birds, such as thrushes, buntings, finches, &c., are able to rest on the sea, even when a little in motion, and afterwards to resume and pursue their flight with fresh vigour. Of this I shall give the particulars further on; but, for the present, I return to the above question, by giving an instance of endurance on the wing of a species which, with pretty good certainty, may be said every spring to perform, in the period of one night, a flight of more than 1200 geographical miles, namely, from Egypt to Heligoland; the bird in question being a particular form of bluethroated warbler (*Sylvia cærulecula*, Pallas).

This pretty little bird, noted not at all either for rapidity or great endurance of flight, has its summer quarters in the high northern latitudes of Sweden, Finland and Siberia; whereas during the winter months it is staying principally in Egypt. On its spring migration, which takes place during the earlier half of May, the first place north of Egypt where it is to be found with certainty in pretty considerable numbers is Heligoland. Nowhere in the whole intermediate distance is it met with but as a great rarity, not even on the neighbouring north coast of Germany; whilst here in Heligoland I have oftentimes obtained it in such numbers that more than twenty of the finest adult male birds have been bought by me in one day, and perhaps the same number by the bird-stuffers of the island. The foregoing admits of one conclusion only, namely, that this little bird performs the passage

from Egypt to Heligoland in one uninterrupted flight, travelling, as many of the smaller Insectivoræ do, during the night, starting towards sunset and arriving here about sunrise or a little later, the time occupied being from twelve to fourteen hours. The distance from Egypt to Heligoland being about 400 geographical miles less than that between Newfoundland and Ireland, the rate of flight of this delicate little bird may be put down the same as that rendered by the above-mentioned carrier pigeon, and consequently furnishes a further proof that a healthy well-flying bird is able to cross from the nearest point of America to Ireland without any rest or extraordinary support whatever.

In the foregoing I alluded to the aptness of non-natatorial birds of resting, in case of exhaustion, on the sea, and of rising from it after having recovered sufficient strength to resume their flight, and that at times, too, when the water is far from being unruffled. This statement is based on the following observations. One day, when out in a boat shooting, about two or three miles from Heligoland, I observed a very small bird swimming on the water. Neither the boatman nor myself being able to discern what species it belonged to, we became very eager to secure the stranger, conjecturing that it would turn out to be some wonderful rarity. When preparing to fire I fortunately discovered that the expected prize was nothing but a song thrush! Immediately our desire to kill was changed into compassion: the "poor thrush" in so piteous a situation was to be "saved." But how great was our astonishment when, upon the approach of the boat, the bird, without any apparent difficulty, rose from the water and flew towards Heligoland in first-rate style! Another time we saw a snow bunting, evidently very much exhausted, because it was floating scarcely 500 yards from the island. At the approach of my boat this bird also very lightly rose from the water, but it was so weak that it had to resume its unnatural resting-place after proceeding about thirty or forty yards towards the rocks. We went after it again and for the third time, but with the same result, whereupon we refrained from all further attempts at forcing our well-intended assistance upon so obstinate a fellow, the more so as we entertained no doubts that after a little rest he would obtain a more solid footing without any help of ours.

I will give one more instance of the propensity in birds, in all my experience the most striking. This time it was a mountain finch which had been compelled to alight for rest on the water of the sea; it was about three miles east of Heligoland. When this bird was

approached by the boat, it rose very easily, mounted into the air to a great height—as birds do when starting for their migratorial excursions—and then struck out steadily in a southern direction, without taking any notice whatever of the island.

Although I believe the foregoing to have proved sufficiently the possibility of birds being capable to cross on the wing from the United States of America to Great Britain, the greatest probability that they do so is still shown by the proportion the number of American birds in Great Britain bears to that of those obtained in the whole of Europe. Yarrell, in his 'British Birds,' 1845, mentions more than forty instances of that description; *Tringa rufescens* and *Scolopax grisea* having been obtained six times each! whereas Germany, Holland and France together offer but very few instances, some of which scarcely rest on good authority.

Heligoland seems to form a happy centre. Here the gulls of the Arctic Sea (*Larus Rossii* and *L. Sabinii*) meet the Nunidian crane, *Grus Virgo*, *Lanius phœnicurus*, and other African birds; whilst the United States send *Mimus rufus* and *T. lividus*, *Sylvicola virens*, *Charadrius virginicus* and others, to meet deputations from the far east of Asia, consisting of *Turdus ruficollis* and *T. varius*, *Sylvia javanica*, *S. caligata* and *S. certhiola*, *Emberiza rustica*, *E. pusilla* and *E. aureola*, *Pyrrhula rosea*, and a great many others.

All these birds, together with a great number of acquisitions quite as valuable for the European Ornis, *all captured on this island*, are preserved in my collection,—a collection which, although scarcely approaching to three hundred specimens, has, by Blasius, been pronounced to be "the most interesting between Paris and Petersburg."

Ornithological Notes from Felixstow, on the Essex Coast.—On the 7th of October, while at breakfast, I noticed a number of swallows passing the windows at short intervals, not in dense flocks but rather straggling, some over the land and some over the surface of the sea. I soon observed that they were accompanied by a few martins of both species, and that occasional large flocks of short-winged birds passed the windows also, and that *all* were travelling southward along the line of coast; not one solitary individual returned, or was seen moving in the opposite direction. The martins, however, which had nestled under the eaves of our dwelling, did not join them, but continued flitting about as usual. The short-winged birds were too distant to ascertain the species, but they were very numerous, and in close flocks, as if for mutual protection. The contrast between their feeble, jerking flight, and the easy, gliding motion of the chimney swallows, was very striking. This continued till about 10 o'clock A.M., when the migration (for such it undoubtedly was) ceased for that

day. Of course I could not at all calculate the number of birds which passed in those two or three hours; but, seeing that there was never more than a very few minutes' cessation, if so much, and that often there was a widely-scattered flock of *Hirundines* and a very dense one of the others, I should think some thousands must have gone by. On the 8th I was earlier on the look-out, and noticed a similar tide of birds to begin flowing southward soon after sunrise, and to continue till about the same hour as on the previous day; the chimney swallow by far the most numerous. On the 9th and 10th the weather was less favourable, and much fewer birds passed; yet the same thing occurred to a limited extent, and continued, gradually lessening, up to the 20th, with the exception of one day (the 16th I believe), which was very stormy, and on which none were observed. On the 17th a very large flock of house martins almost covered a sloping warm roof of a farm-house at Walton, a mile distant, evidently preparing for their departure, yet basking in about the warmest sunshine we had known all the year. I spoke of the migration past our window as continuing up to the 20th of October. On this day a great multitude passed by, but by far the larger proportion were house martins, from which it would seem that this bird is rather the latest in leaving us. A few, and but a very few, were observed on the 21st. Not a solitary individual of the summer visitors was seen on the 22nd, 23rd or 24th, except that on the 23rd, on visiting the roof where such a multitude of martins had congregated on the 17th, two very feeble chimney swallows were perceived to have settled upon it,—decidedly late birds of this year, in too weak a state to attempt a flight to distant lands. All the resident martins had disappeared from our habitation on the 22nd, doubtless gone with later migrations to seek a warmer clime. Query, why should the birds pass in the mornings only, all symptoms of migration ceasing before 11 o'clock? If any individuals were observed after this time they were only to be seen hawking up and down as usual. It may be suggested from the foregoing observations that migration takes place gradually,—that reinforcements swell the tide of birds as it sweeps along the line of coast, and that these interesting summer denizens of our groves, our gardens and our habitations repair to the shore at the time of departure, and keep along the coast, crossing the estuaries, until probably they reach the Straits of Dover, where the Continent of Europe may be reached without much risk, and from whence but little of the mighty deep need be encountered in passing to the warm regions of Africa. On the 25th of October I saw six individuals of the chimney swallow on the wing, some distance from the coast, to all appearance in the act of migration. On the 12th I observed considerable flocks of skylarks arriving from off the sea. At first it did not strike me as anything unusual or strange; but, having noticed the same thing repeatedly since, I am inclined to think that there is an influx of these birds to our shores in the autumn, or how can we account for the immense flocks that cover our fields in the winter? I noticed also that they began their delightful song (to me they are the sweetest of all our choristers) about the first week in this month, and that it has continued to this day (the 25th), so that the fields resound with their music fully as much as in spring. The hooded crow has also appeared here within a few weeks in great numbers, and seems to be the prevailing crow in this locality. Five wild geese, probably Brent or bernacle, seen on the 17th, flying not far distant over the sea; and six geese on the 21st, also over the sea, but more distant. On the 25th I saw a flock of ducks, or of the duck family, at a distance over the sea. The last few days, viz., from the 21st to the 25th, I have observed the mountain sparrow. One was hopping about on the shore but a few yards from our feet, seeming very tired and

hungry ; I picked up one drowned, also one male chaffinch ; I could not observe any wounds about them. Did they fail in reaching the shore while attempting to cross the German Ocean ? I think Linneus and Gilbert White consider there is a migration of male chaffinches. Vast flocks of goldfinches and linnets are here. They appear to feed on the seeds of the thistles and other weeds which abound on the cliffs. One large flock, I believe of dunlins, I saw on the 21st. Once I observed, at a distance over the sea, some terns, as I apprehend from their slender proportions and the acute angle of their wings. Starlings were very abundant, also titlarks. On or about the 30th I picked up a second male chaffinch on the shore, apparently drowned. On the 3rd of November I noticed for the first time some fieldfares, on a hawthorn hedge in front of our lodgings ; they were in company with a number of blackbirds, and after a time were seen with them seeking their food in the grass in the pasture adjoining. I have not seen them here since, and only a solitary one anywhere else. On the 4th, while walking with my brother in a meadow near the sea-shore, where a small rivulet runs by the side of a hedge, my attention was arrested by a rustling noise among the overhanging brambles ; and, turning my eye to the spot, I saw a bird endeavouring to force its way through them. At first I thought it was a little bantam hen, and waited till it made its exit, during which process I could easily have taken it in my hand. My surprise was great on seeing it take wing—a woodcock. It flew heavily about fifty yards, and again alighted in the little brook, allowing me to approach within about five yards before it rose, when it crossed a small grove and dropped on the other side. We did not pursue it further, nor did we see another, which we rather expected, as this one had evidently just crossed the water and was much fatigued. The wind had been blowing fresh from the north-east for two or three days. In escaping through the brambles the bird had left some of its beautiful feathers, which we took as a small compensation for the loss of the living specimen, which might have been so easily secured. On the 5th I saw some terns (the species not known) flying over the water near Landguard Fort. It would appear that these birds do not (all at least) leave this coast in the winter. I remember being the companion of Henry Doubleday when he shot some near Walton-on-the-Naze, in December, many years ago. On the 6th of November I saw a flock of ten or twelve stock doves feeding in a stubble field near a wood. They were very shy, and did not permit a near approach. I may here remark that the 27th, 28th, 29th and 30th of October were beautifully bright and calm, with the exception of occasional fog. On the 28th it was very hot, yet on none of these days did a single swallow or martin, or other summer bird, come under observation. I watched closely along the sheltered cliffs facing southward, which are thickly perforated with the holes of the sand martin, without seeing a solitary individual of this or any other of our Hirundines.—*Jonathan Grub ; December, 1860.*

The Red and Blue Maccaw (Ara Macao) of Honduras.—This maccaw is plentiful throughout the whole country, and generally to be seen in pairs, but sometimes in companies of from six to twelve. I have seen as many as thirty together about roosting time, flying towards some lofty trees situated in the forest, which no doubt they were in the habit of frequenting at night, having assembled for that purpose. They are in the habit of feeding in the maize fields morning and evening, and are not difficult of approach. If one is wounded its shrill screams attract others, and they wheel overhead, giving opportunities for fresh shots. In this way I shot three within five minutes, from the back of my mule, and without moving from one spot.

This was near Comayagua. They are strong on the wing, and high flyers. Their brilliant plumage and long tails have a splendid effect in tropical forest scenery, forming a strong contrast to the deep green of the foliage, and a brilliant addition to the landscape. I have seen them up in the pine-ridges, and recollect riding beneath a pair sitting so close together on the branch of a pine tree overhanging the road that I could have killed both at one shot. They were abundant in Tigre Island.—*G. C. Taylor, in the 'Ibis,'* ii. 120.

The Yellownaped Green Parrot (Chrysotis auripalliata) of Honduras.—Very plentiful in Tigre Island, but I did not observe it elsewhere; nor did I see any large parrots after I left the coast until I arrived at Yojoa, where there is a parrot much resembling this in plumage, but rather smaller, with the yellow on the fore part of the head instead of behind. They were flying in great numbers towards their roosting-places, and passed close overhead; but it was unnecessary to shoot one, as I saw many in the town in a state of domestication. In common with the other Psittacidæ they are very noisy early in the morning and in the evening. At these times they feed in the maize fields, and are easily shot. In Tigre Island I have seen them fly so close to the house that I could have shot them from the windows. They sit on the trees like pigeons, and do not appear to be frightened by the report of a gun. When they are in the tree-tops it is difficult for any one standing beneath to perceive them, as their green plumage cannot be distinguished from the foliage. I have often stood beneath a tree full of them without being able to see one. They roost in flocks. They have favourite roosting-places among lofty trees, where they assemble just before dark, and may be seen making for these common centres in great numbers, chattering and screaming as they fly.—*Id.,* ii. 121.

Note on the Alpine Chough as observed in the Ionian Islands.—I only observed once a pair of this species in Epirus; this was in May, 1857, when I was chamois-hunting in the Acroceraunian Mountains, above Khimàra, about forty miles north of Corfu. I have since had many opportunities of observing closely the habits of this very graceful bird in the mountains of Nice and Piedmont. Often, when I have been crouched behind a rock waiting for a shot at chamois, they would settle on a point of rock or ice within a few yards of me, and hop fearlessly about, occasionally whistling and chattering, as if to inquire of each other what possible business brought me up to their haunts. I was on one occasion surrounded by a party of about a dozen of this species, which kept up an incessant noise for about half an hour, when one of them suddenly turned his head towards the sky, uttered a very peculiar croak, and the whole party immediately crouched close down on the rocks and snow. I looked up, and a golden eagle came whizzing past me with wings nearly closed, in pursuit, I think, of a marmot; the choughs immediately sneaked off, and paid me no more visits that day. I have seen a pair of these birds go through a sort of game of catchball with a small pebble, tossing it up from one to the other, and catching it in their bills. I have been informed on good authority that the Cornish chough (*Fregilus Graculus*) is not rare on Parnassus and the Pindus range, but I have never seen it in Turkey or Greece.—*Hon. T. L. Powys, in the 'Ibis,'* ii. 136.

Occurrence of the Little Bustard (Otis tetrax) in Essex.—A female specimen of the little bustard was shot on the St. Osyth marshes, by Mr. Denne, of St. Clair Hall, on the 17th of the present month, and was shown to me in the flesh by Mr. Cater, the bird-preserver of Priory-street, in this town, to whom it was sent to be set up. The distal ends of the wing and tail-feathers were rubbed. Mr. Denne, who was good

enough to call upon me in answer to a note of inquiry, says that he rose the bird from among the rushes on the marsh, and that it flew into some young clover, where, an hour afterwards, having returned with his gun, he shot it. It was not at all wild. Yarrell mentions three instances of this bird having been killed in Essex. Dr. Maclean tells me one was shot, also close to Colchester, at Berechurch, a few years ago. The locality in which the subject of the present notice was killed is close to Great Claston, one of the places mentioned by Yarrell. The bird measured full 18 inches, and was upwards of 10 inches from carpus to tip. — *C. R. Bree; Colchester, December 22, 1860.*

Occurrence of the Little Bustard in Suffolk.—A fine male specimen of the little bustard was caught in a rabbit-trap in a turnip field in this vicinity, on the night of the 10th of December last, or the following night, my informant not being quite certain which of the two. It was taken alive to a farmer named Merrells, on whose land it was caught, whose intention it was to have roasted it, but a gentleman from Saxmundham called upon before he had put the culinary design into execution, and saved the bird's remains for a higher destiny. It was sent to Ipswich and preserved, and in the meantime was made over to Mr. E. Garrett, of Aldbro', who has it now I believe. I believe this to be a very good neighbourhood for rare birds, but the poor people who generally obtain them are mostly ignorant of their value. — *Edward Neave; Leiston, near Saxmundham, Suffolk, January 10, 1861.*

Skins and Eggs of the Great Auk (Alca impennis).—Thinking it may be interesting to the readers of the 'Zoologist' to know who are in possession of the birds and eggs of the great auk, a bird now presumed to be extinct, it gives me much pleasure to subjoin the following list. Should any omissions or errors be detected I should be glad if any of your correspondents would favour me with the communications:—

BIRDS.				EGGS.			
			Specimens.				Specimens.
British Museum...	...	...	2	British Museum...	...	...	2
York ditto ...	...	...	1	Lord Garvagh ...	...	...	2
Newcastle ...	...	...	1	Sir W. M. E. Milner, Bart.	...	...	1
Dublin ...	...	...	1	Sir W. Trevelyan, Bart.	...	...	1
Private collections in England	...	...	9	Mr. Newton ...	...	...	3
United States ...	...	...	1	Mr. Champley ...	...	...	2
Dresden Museum ...	...	...	1	Mr. Bond ...	...	...	1
Vienna ...	...	...	1	Mr. Hancock ...	...	...	1
Private collections in Germany	...	...	5	Mr. Labrey ...	...	...	1
France ...	...	...	1	Mr. Tuke...	...	...	1
Russia ...	...	...	1	Mr. Troughton ...	...	...	1
Denmark...	...	...	2	Rev. H. B. Tristram ...	...	...	1
			—	Mr. Walter ...	...	...	1
			26	Executors of the late Mr. Salmon	...	...	1
				In Ireland ...	...	...	2

—*Alfred Roberts; King Street, Scarborough, January 7, 1861.*

A Sea Serpent. — As Samuel Townsend, Esq., J.P., of Whitehall, was sailing in Whitehall Harbour, he saw, following his wake, what appeared to him (from the many descriptions he had read of the monster) to be a sea serpent about twenty-five or thirty feet in length; and being in a small boat he endeavoured to keep as respectful a distance as possible. There was, however, another boat in the harbour at the time, in which was Mr. Samuel Hingston, his brother, Mr. John Hingston (of Trinity College, Dublin), and a party of ladies. These parties also saw the huge monster; and upon raising its neck about six feet above the surface the females became greatly alarmed, when Mr. John Hingston, who is a remarkably good shot, fired at it, upon which it immediately disappeared. Mr. Townsend informed us the serpent presented a beautiful appearance, having large, brilliant scales of a yellow hue, and is of opinion it was struck by the shot fired by Mr. Hingston. It was likewise distinctly seen from the windows of Whitehall House. Mr. Robert Atkins told us he saw it the day before off Barlogue.—‘*Skibbereen Eagle*,’ as quoted in the ‘*Cork Constitution*’ of Sept., 1860.

On the Discovery of Physa acuta, Drap., in England; with Remarks on a Shell that may prove another addition to the British Physæ. By the Rev. ALFRED MERLE NORMAN, M.A.

A DESCRIPTION, with observations and figures, of the *Physa* discovered by Mr. Choules, has already been sent to the ‘*Annals*,’ and will probably appear in the February number of that periodical. As, however, many conchological readers of the ‘*Zoologist*’ may not have an opportunity of seeing the former journal, the following diagnostic characters of this species and *P. fontinalis* are forwarded for insertion.

PHYSA ACUTA, *Draparnaud*.

Physa acuta, *Draparnaud*, *Dupuy*, *Michaud*, *D’Orbigny*, *Deshayes*, *Moquin-Tandon*, &c.

? *Bulla rivalis*, *Maton & Rackett*, *Montagu*, &c.

Animal.—Mantle-margin not reflected on the shell, but sending forth minute digitations, viz., four behind, consisting of three, often rudimentary, lying on the spire; the fourth longer, reflected in the angle formed by the junction of the outer lip with the body; and six in front, small, spread in the form of a fan on the columella, and too short to be seen from above. Foot shorter than the spire when the animal is crawling. Tentacles slightly thickened towards the end, and having a black central line.

Shell long-ovate, with an acute apex, thin, but stronger than that of *P. fontinalis*, transparent, horn-coloured. Whorls four and a half or

five, swollen, with a deep suture. Length $5\frac{1}{2}$ lines, breadth $2\frac{1}{2}$ to 3 lines. Mouth occupying about half the total length. Pillar-lip twisted, the swelling body-whorl projecting into and contracting the mouth above. A distinct narrow umbilical chink, formed by the reflexion of the pillar-lip upon the columella.

The above description, which applies, not to the ordinary form of *P. acuta* as found on the Continent, but to the variety *γ. minor* of Moquin-Tandon, is drawn up from examples of the Kew *Physa* forwarded to me by Mr. Choules. The locality from whence the species is presumed to have been introduced into the Kew Gardens, and which is several miles distant from the latter, has been communicated to me, and having examined specimens from thence, and satisfied myself of their identity, I see no grounds for doubting the indigenoussness of *Physa acuta* in that habitat.

PHYSA FONTINALIS, *Linneus*.

Animal.—Mantle-margin extensile and reflected on the shell; digitations large, flat and numerous, viz., five or six behind, enwrapping and surmounting the apex of the spire; and five to eight on the columella, extending half round the body, and distinctly visible when the animal is viewed from above. Foot longer than the spire. Tentacles tapering to their extremities, pale.

Shell ovate, with a blunt apex, thin, fragile, transparent, horn-coloured (rarely white). Whorls three and a half to four and a half, their suture shallow. Length $4\frac{3}{4}$ lines, breadth $2\frac{3}{4}$ lines. Mouth occupying four-fifths of the total length. Pillar-lip scarcely twisted. No umbilical chink. Outer lip forming an acute angle by its junction with the body, and descending direct from the suture.

For some years I have had a *Physa* in my cabinet which would seem to be specifically distinct from all yet described; and I take this opportunity of drawing attention to the form in the following description:—

PHYSA ——— ?

Shell subquadrangular-ovate, with a very blunt apex. Body-whorl greatly swollen, and mouth widely expanded. The outer lip forming a right angle at its junction with the body, and projected a short distance directly outwards before the downward slope commences. Whorls three and a half. Length $5\frac{1}{4}$ lines, breadth $3\frac{3}{4}$ lines. Mouth occupying six-sevenths of the total length.

This shell differs from that of *P. fontinalis* in its larger size, its form, the great development of the body-whorl, the shortness of the spire and the contour of the outer lip. Only two examples were procured, and one of these is imperfect. The examination of the animal must decide whether the claims of the shell to specific distinction are well grounded or not. The following circumstance leads me to think that the animal will be found to differ from that of *P. fontinalis*:—In the case of those Mollusca that have the mantle so developed as to enwrap the shell, the surface of the shell is highly polished and free from extraneous coating; *Physa fontinalis*, the *Amphipepleæ*, the *Cypreæ* and the *Marginellæ* may be taken as examples. On the other hand, the shell of *Physa acuta*, which we have seen has very short digitations of the mantle, is commonly more or less clothed with confervoid growth. Now, the shell of the doubtful *Physa* is coated with a calcareous earthy deposit, and that green *Conferva* so common to fresh-water shells. I am therefore led to infer that the animal differs from that of *P. fontinalis* in having the mantle-margin and its processes but little if at all developed.

The footpath from Oxford to West Hincksey, after passing the railway pond and railway, is bounded on either side by a ditch, in which the water-lilies (*Nymphæa alba* and *Nuphar lutea*) grow. The ditch on the right was the habitat of the above-described shell. If any reader of this paper should have the opportunity of searching for, and succeed in finding, this *Physa*, I should feel greatly obliged if he would favour me with *living* specimens. They should be wrapped in a little duckweed to keep them moist, and forwarded in a wooden box by post.

ALFRED MERLE NORMAN.

Sedgefield, Durham,
January 5, 1861.

The Firth of Clyde Mollusca: Errata.—The reader is requested to make the following corrections, with a pen, in the last part of the 'Mollusca of the Firth of Clyde.' P. 7238, line 4 from bottom, and p. 7239, line 3, for Gowrock read Gourock; p. 7238, line 3 from bottom, for Lamillaria read Lamellaria; p. 7239, line 14, for Allan read Arran; p. 7241, line 5 from bottom, p. 7247, line 9, and p. 7248, line 4, for Philene read Philine; p. 7240, line 7, for sepangularis read septangularis; p. 7240, line 10, for Ptilidium read Pilidium; p. 7240, line 19, for Lefroyi read Leufroyi; p. 7242, line 32, for Man read Arran; p. 7245, line 3, for rustica read oculata; p. 7247, line 12, for Amouroncium read Amouroucium.—*Alfred Merle Norman; January 5, 1861.*

Observations on the 'Catalogue of the Lepidopterous Insects in the Museum at the East India House.' By R. F. LOGAN, Esq.

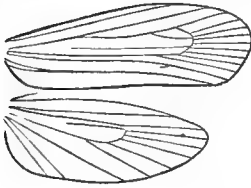
I HAVE read with much interest Mr. Newman's critique on the 'Catalogue of the Lepidopterous Insects in the Museum at the East India House,' and I think everyone must agree with him in regard to the intrinsic merits of the work, as throwing so much valuable light on the transformations of Eastern Lepidoptera; and also in respect to the zeal and ability with which the details have been worked out, so as to present it to us in its present form. The plates and details of transformations are invaluable; and one has only to regret that the eggs, and in *every* instance the pupæ, as well as the cocoons, could not have been represented. Why the eggs of the Lepidoptera should be so entirely ignored as they are, by all modern entomologists, is difficult to explain, since they afford, in many instances, most excellent characters of genera, and also of the larger divisions; and had we sufficient data a system might be built thereon, which might prove quite as good as that based upon the larvæ, and in many cases would no doubt prove corroborative of it.

Such systems, however, if pushed to extremes, must always prove defective, as there is no rule, even in nature, without an exception; and it is only by carefully weighing the characters derived from the transformations, in connexion with those of the perfect insects, that we can ever hope to arrive at the natural arrangement. Consequently, until we know a vast deal more of the preparatory states of exotic Lepidoptera, we can scarcely hope to solve the mighty enigma of their classification, though every step taken in the right direction places us on surer ground.

Looking at it in this light, every true naturalist must hail with pleasure the appearance of a book like the present, which, though it may be defective as a whole, yet gives us many steps in the right direction. Stirpes II., V., VI. and VII. are pre-eminently natural divisions of the Bombyces, corresponding almost exactly with the families Liparidæ, Attacidæ, Limacodidæ and Lasiocampidæ. The genus *Ichthyura* (*Clostera* —), however, comes in unnaturally where it is placed, and must be removed from Stirps II., and placed along with *Phalera* and *Anthena* in Section ii. of Stirps IV., as these genera cannot be separated from the rest of the Notodontidæ, notwithstanding the difference in the larvæ.

Stirps I., as Mr. Newman remarks, is composed of materials which

undoubtedly admit of better arrangement, and ought properly to be broken up into several stirpes of equal value with the other seven. The genus *Zygæna* cannot possibly, in any natural arrangement, be widely separated from *Chalcosia*, *Procris*, &c., either by the characters of the larva or imago; and these genera, along with *Erasmia*, *Campylotes*, *Eterusia*, *Pintia*, *Soritia*, *Herpa*, &c., undoubtedly form a natural stirps or family by themselves, distinct from *Syntomis*, *Glaucopis* and *Euchromia*, the latter of which approaches more nearly to the *Chelonidæ*, with which it is connected by means of some American genera, such as *Lophocampa*. *Atteva Brucea*, which is included in this stirps (page 300) belongs to the *Tineina*, and probably to the family *Yponomeutidæ*, as the accompanying sketch of its wing-venation, added to its other characters, will sufficiently show.



Stirps III. is a compound of the *Chelonidæ*, and a group of insects which Mr. Walker, in the British Museum 'Catalogue,' has associated with the *Liparidæ*, but which appears to me to belong to neither of these groups, but to form a separate and independent family, connecting the *Liparidæ* and *Lasiocampidæ* with the *Attacidæ*, and for which I would suggest the name of *Daralidæ*. They are robust, woolly insects, with broad, substantial wings, densely clothed with scales both above and below, having much the aspect of some of the aberrant *Attacidæ*, which they approach to some extent in the venation of the wings; but they possess the connecting bristle at the base of the under wings, which prevents their being associated with either the *Attacidæ* or *Lasiocampidæ*, while the character of their transformations will equally prevent them from being merged in the *Liparidæ*. There is, however, considerable diversity of structure among the species in Mr. Walker's genera; and it is quite possible that some of the insects in question, such as *Tagora amæna*, which wants the bristle, may truly belong to the *Lasiocampidæ*, to which family their transformations closely approximate.

R. F. LOGAN.

Duddingston, Edinburgh,
December 4, 1860.

Rate of Speed of Flight of a Butterfly. — Mr. Horne's calculation of butterfly speed (Zool. 7280), astonishing as it is, conveys but an imperfect idea of the actual

distance traversed within the hour by the painted lady; for, taking into account the zigzag order of flight, which it doubtless maintains by sea as well as by land, it must have been winging its way at the rate of some fourteen or fifteen statute miles per hour, and that, too, against a head wind; for he says "It readily overtook the steamer, which was then making $10\frac{1}{2}$ knots an hour. The wind was nearly ahead, and tolerably strong." My object in directing attention to this statement is to suggest that there must be some mistake with regard to the direction or force of the wind; for, considering what a slight and fragile insect the butterfly is, and its immense expanse of wing, our wonder is increased to amazement on hearing that it not only made head against adverse winds, but outstripped a fast boat like the 'Pera.'—*H. Hadfield; Ventnor, Isle of Wight, December 1, 1860.*

Interesting Fact in the Economy of the Genus Colias.—Mr. C. S. Gregson, of Stanley, Liverpool, the talented Secretary of the Northern Entomological Society, has discovered that the females of the genus *Colias* lay their eggs "in the seeds of clover, and especially lucerne," and are thus imported from the Continent. This is the only instance hitherto discovered of a butterfly laying its eggs either *in* or *on* the seed of a plant; and as the pod of both the species of Leguminosæ mentioned is extremely hard and wood-like, it is very difficult to conceive how the egg can be introduced through this natural envelope. In this country our two species of *Colias* only frequent the clover and lucerne when in blossom, so that their economy would appear to be different on the two sides of the Channel. Mr. Gregson's most important statement is communicated incidentally at page 55 of the 'Intelligencer.'—*Edward Newman.*

On the Habits of Bombyx Callunæ.—Both Mr. Stainton and Mr. Newman describe this insect as a variety of *Bombyx Quercus*. The following is my description of *B. Callunæ*, from personal observation:—*B. Callunæ* is found in profusion on Greetland Moor, near Halifax. *Male* $2\frac{1}{2}$ to $2\frac{3}{4}$; rich dark mahogany-brown, the fore wings having a broad, transverse, semicircular bar in the middle of the wing, of a bright fulvous colour; this bar is most distinct throughout, one-eighth of an inch broad, tapering from the front; midway between the bar and the body is a white spot, surrounded with a dark ring: the fulvous bar extends across the under wing, which also possesses a margin, of the same breadth and colour: the body and head are dark above, but lighter underneath. *Female* $3\frac{1}{4}$ to $3\frac{1}{2}$; of lighter colour than the male, the bar being of the same colour as in the male, but having a narrower margin on the under wing; the bar is not shown underneath the wings, each wing being half dark and half the colour of the bar on the under side. *Caterpillar.*—Natural food heath, but will thrive on whitethorn and mountain ash. It is large when full grown, being $3\frac{1}{2}$ inches in length; when young it is smooth, and of the dark colour of the male insect; after the first and second changes its colour is somewhat lighter, and after the third change of skin the ground-colour assumes a beautiful velvet-black, which is observed between each double segment, whilst the latter are covered with short hairs of the fulvous colour of the bar in the imago; a few straggling long dark hairs, tipped with white, spring up over the downy segments, and along each side of the caterpillar is a whitish waving line interspersed with gray spots; the ground-colour of the downy segments is dappled gray; a row of pure white oval spots appear in the centre of each black segment along each side, the largest being on the segment near the head, and gradually decreasing in size. The under side of the body is greenish yellow. *Pupa* elongated egg-shaped, of a gray-brown colour, very compact, and surrounded by a soft web-like cocoon, and found on the surface of the moor, attached to the base of

heath. *Egg*.—The female never flies until after copulation or depositing her eggs, which she plays around the stems of the food-plant, in May and June. The larvæ emerge in from fourteen to twenty-one days, feed during the summer and autumn, undergo three changes, and then descend to the roots of heath, where they spin a slight web, and so continue during the winter months. In the following spring they again come forth, and feed during the summer, undergoing three or four further changes of skin, and make up into pupæ during August and September. *Imago*.—In May and June of the subsequent year the perfect insect comes forth. The females of *B. Callunæ* possess the peculiar power of attracting the male, which is a characteristic of this family; by this means numbers of males are captured.—*W. Shipston (in the 'Intelligencer')*; 3, *Lower Brunswick Street, Halifax, November 14, 1860.*

Description of the Larva of Epione advenaria.—Eggs laid June 23. Oval; yellow, changing to red and then smoky. Hatched July 10: tried the larvæ with several plants; at last they began to feed on rose: afterwards procured bilberry for them, which they refused. The bilberry does not grow in the wood where the perfect insects are taken, but the common white burnet-rose abounds. At first dark brown, nearly black, with four white bands, having a granulated appearance; head black and white. After first moult dull purplish brown, with yellowish white spots (two near dorsal line the longest and most conspicuous), nearly forming a band on front of 6th segment; two similarly coloured spots on 12th segment, and an undulated lateral line of same colour, broadest behind, where it is mixed with the ground-colour, as that also is freckled with yellowish; head dull black, with two yellowish streaks. Full fed darker, especially towards the head, marbled with gray; whitish marks as before, but less conspicuous. Went into pupa among moss drawn together by a few threads, October 30. I always fed it with a smooth-leafed rose growing in the garden, as nearly like the wood-rose as I could find, and it always ate freely. It will be seen by comparing the dates that it was a long time in the larva state. I have tried the wood where the perfect insect is taken for the larva, but in vain.—*E. Horton (in the 'Intelligencer')*; *Wick, Worcester.*

Description of the Larva of Odontopera bidentata.—A true Geometer, but having eight claspers, the usual pairs on the 10th and 13th segments, and a pair each on the 8th and 9th segments; these last are perfectly formed in every respect, but are extremely small, and totally useless in walking: the 12th segment is slightly humped, the swollen portion crowned with two small warts, and there is a narrow oblique velvety ridge, on each side of the 12th segment, leading towards these warts: the head is decidedly but not deeply notched on the crown: the body is a good deal wrinkled transversely, and is of a dull brown colour inclining to purple, with scarcely any shading or variety of colour. I beat a considerable number of these larvæ from birch at the end of September, and on the 2nd of October they ceased eating, and, hiding themselves in moss, changed to pupæ with scarcely any cocoon.—*E. Newman.*

Description of the Larva of Iodis lactearia.—Body extremely long and slender: posture when at rest straight or curved, not uniformly the same. Head prone, with the mouth bent under, the crown deeply divided, terminating in two sharp lobes; pale brown: 2nd segment bearing two sharp-pointed approximate humps on the back; none of the other segments bear either warts or humps: body pale delicate green, with a dull red median spot, laterally bordered with yellow, on the interstices between the segments following the 3rd. Feeds on oak: full fed September 16th to October 12th. Spins a few threads across the leaves of its food-plant, and turns into a pupa in the home thus formed: it remains in the pupa state all the winter.—*Id.*

Occurrence of Cidaria reticulata in the Lake District. — Three specimens of this pretty and very distinct species were taken in August, 1856, on the border of one of the Lakes, by my friend Thomas H. Allis, who requested me to send a notice of its capture for insertion in the 'Zoologist.' *Cidaria reticulata* is not common anywhere; according to Guenée it is found in the Swiss Alps, Pyrenees, Hungary and the South of Russia. The larva is unknown, but probably feeds upon *Epilobium*, like that of *C. silacea*, the species most nearly allied to *C. reticulata*. — *Henry Doubleday; Epping, January 14, 1861.*

Description of the Larva of Anticlea berberata. — Rests in a slightly bent posture; frequently falls when touched, and when on the ground wriggles somewhat in the manner of a Tortrix larva. Colour dingy gray-green approaching to brown. The 2nd, 3rd and 4th segments have a median black stripe, that on the 4th extending only half the length of the segment; the 10th, 11th and 12th segments have also a median black stripe, but less distinct; the dorsal surface of the segments intervening between the 4th and 10th is mottled with shades of gray, dingy green and brown: the belly is striped longitudinally, the median stripe having several darker blotches, and just before the anterior pair of claspers is a large space conspicuously darker. Feeds on *Galium verum* (lady's bedstraw), and is full fed about the 10th of July. I am indebted to Mr. Smithson for this larva. — *E. Newman.*

On the Economy of Epunda lichenea. — The ova, which are deposited about the beginning of October, hatch early in November; the larvæ remain very small during the winter, and are mostly hid amongst roots of grass. About the beginning of January they begin to show out by night, and to feed very ravenously on groundsel, &c., and to grow very fast. They are of a green colour, the spiracular line whitish: they still retain the green colour after several moults, when they appear in a mottled olive suit. When young they repose in the position of *Sphinx Ligustri*, with their head and fore legs erect, on the stems of dry grass; they will feed very ravenously on groundsel, and thrive on it well; but as the spring advances I feed them on chickweed, dock, dandelion, scabious, burnet, &c.: they feed on until May, when they assume the pupa state; I never had any remain in the larva state until June, although Merrin's 'Calendar,' in July, p. 74, says, "*E. lichenea*. Ragwort, foxglove, &c." I never, out of many dozens, during two or three years' experience of rearing them, saw any above the surface after May. I do not by any means think them a tender larva to rear; I have during the last two or three years reared about three-fifths of them on an average. They form a cocoon of a web-like texture, mixed with the earth; the pupæ are rather blunt at the ends: they generally lie in that state for about four months, and in September emerge. My method of rearing them is this: in a clear wide-mouthed glass bottle I put the ova, also a piece of white paper, and cover over the top of the bottle with a fine piece of gauze, so that when the larvæ hatch I can see them creep on the paper; I then put in some dry stems of fine grass and a small leaf of groundsel, so that there should not be too much refuse left; they soon leave their food and creep on the fine grass to repose, and I then remove the refuse: every evening I put in fresh food, and always remove what they leave; but after awhile, when they improve in size, I remove them to a medium-sized flower-pot, half filled with loose mould and pieces of turfy grass, under which they generally hide by day, and at night they come out to feed, when I put them in some fresh: in clearing out the refuse care must be taken not to throw away any of the larvæ which may be hid in it. By following these instructions I think there would be no difficulty

in rearing these larvæ: they will breed freely in confinement, as I have tried them several times and always with success.—*J. S. Dell (in the 'Intelligencer')*

Dianthæcia capsophila in Cumberland. — At a meeting of the Historic Society, held at St. George's Hall, Mr. C. S. Gregson exhibited *Dianthæcia capsophila*, *Gn.*, a species new to England. The specimens were captured by J. T. Tiltman, Esq., and J. Nicholson, Esq., of Whitehaven, on the coast of Cumberland. Mr. Gregson gave an original account of this description of insects.—*Liverpool Paper*.

[Has Mr. Gregson submitted his specimens to the inspection of any entomologist capable of deciding on the species? A specimen from this supposed new habitat has been brought to London, and is decidedly *Dianthæcia capsicola*. I should like to see Mr. Gregson's specimens, if convenient to him to send them.—*E. Newman*.]

Occurrence of Sophronia emortualis near Henley. — About the 12th of last July I took a fine female specimen of this insect. It has a predilection for sweets, for I took it in company with other sugar-loving *Deltoides* and *Pyralides*. Its colour is a light yellowish olive, dusted with numerous small black spots. A figure of this insect in Wood's 'Index Entomologicus' (first edition, pl. 27, fig. 768) will give a tolerable idea of its colour, though of little else. The first line seems not to be continued on the under wing. There is a crescent-shaped yellowish marking on the under wing, about half-way between the base and the tip of the wing, but it does not appear to rise on the costa, and it distinctly ceases before it reaches the middle of the wing; besides, it is in a different direction to the line on the upper wing, and if continued to the inner margin it would strike the second line. I have examined, by the aid of a common magnifying-glass, what seems to be "the posterior margin of the reniform stigma," of which Mr. Cooke speaks; but I cannot trace the rest of the marking of the stigma; and there only appears a yellowish crescent-shaped marking, which corresponds exactly with that on the under wing.—*B. H. Birks (in the 'Intelligencer')*; *Stonor, Henley-on-Thames; October 17, 1860*.

Re-appearance? of Agrophila sulphuralis in Norfolk. — I have to announce the capture of ten specimens of *A. sulphuralis* this year in Norfolk. I took them all in the last week of July and the first week of August, in very good condition, flying over a hedge of Scotch fir. I took nine of them in one place, but the other I caught nearly two miles off. I should have caught several more if it had not been for the bad weather.—'Intelligencer,' *November 3, 1860*.

[Is this reliable? Who is the captor? What is a hedge of Scotch fir?—*Edward Newman*.]

Description of the Larva of Chloëophora prasinana. — Does not roll in a ring or feign death when disturbed: smooth, cylindrical; 11th, 12th and 13th segments rapidly attenuated; the anal claspers long and spreading; all the claspers broad at the disks. Head rather large, pale green, opaque, unspotted: body yellow-green; a yellow ring just behind the head: a median double series of yellow dots disposed symmetrically: on each side below this series is a direct slender yellow stripe; and again, below this on each side are several series of yellow dots symmetrically arranged, and there is a very distinct but slender pink line on the last pair of claspers. Feeds on oak, birch or beech: it is full fed on the 18th of September, and spins a boat-shaped cocoon on the back of a leaf: when the leaf falls this little domicile of the future moth is carried by the wind hither and thither, without ever losing its attachment, until the leaf finds its winter resting-place on the ground, and there the pupa remains, still enclosed in its little yellow silken boat, until the second or third week in June, when the perfect

insect emerges, and, climbing the hole of some tree, there remains until its wings have acquired the necessary rigidity; it then flies up among the branches, and spends the remainder of its life among the leaves, whence it is frequently dislodged by the beating-stick of the entomologist.—*E. Newman.*

Curious Economy of Talæporia pseudo-bombycella.—Between the 10th and 18th of June, 1860, having bred several males and females of *Talæporia pseudo-bombycella*, I was rather surprised to find that some of the females had laid their eggs at the bottom of the jar, for I recollected reading, in the second volume of the ‘*Intelligencer*,’ an extract from Professor von Siebold’s work, entitled ‘On a true Parthenogenesis in Moths,’ &c., where, after remarking that the females of *Solenobixæ* always lay their eggs inside the case itself, he proceeds, “The females of the case-bearing genus *Talæporia*, which approaches most closely to the *Solenobixæ*, proceed in exactly the same way in escaping and laying their eggs.” Why some should lay their eggs at the bottom of the jar, whilst others deposited them in their cases, I am at a loss to account, as they all received the same treatment, and were all in the same jar. Here I should observe that mine is not a solitary instance of their doing so, as the very same circumstance came under the notice of a friend who was breeding the insect at the time. On the 21st I found that the females who had deposited their eggs at the bottom of the jar had covered them with a kind of down: my first impression upon observing this downy covering was that it was intended for the protection of the eggs, but, on cutting open two or three of the cases, inside of which the eggs were deposited, I found them snugly ensconced in the midst of a quantity of the same kind of down as that I had observed placed over the eggs at the bottom of the jar. What purpose this down was intended to answer completely puzzled me until, on the 11th of July, finding several young larvæ crawling up the side of the jar, I examined them by the aid of a lens, when I found that the down (the use of which I could not comprehend) had been so placed over the eggs for the young larvæ to envelop their bodies with; for, on comparing the down round the bodies of the young larvæ with that at the bottom of the jar, I found it was precisely the same material. I also find the following communication by Mr. R. S. Edleston, in the ‘*Zoologist*’ (*Zool.* 5406), respecting a genus closely allied to *T. pseudo-bombycella*:—“*Diplodoma marginepunctella*. The female covers her eggs with a thick coating of fur, in a similar manner to *Porthesia auriflua*.” And further to illustrate my assertion I send you a quill containing a quantity of young larvæ of *T. pseudo-bombycella* for your inspection.—*Charles Healy (in the ‘Intelligencer’)*; 74, *Napier Street, Hoxton, November 27, 1860.*

Means Employed in the Capture of a Nest of Hornets.—In my notice of the capture of a nest of hornets (*Zool.* 7291) I stated my intention of making known “the plan of attack” I adopted, which, with permission, I will now do. The nest was discovered the beginning of August, at which period there did not appear to be more than about twenty workers developed. It was situated in the head of a pollard ash that had been cut down, and was lying in the wood-yard at Cokethorpe Park. Wishing to obtain, if possible, specimens of *Velleius dilatatus*, either in the larva or perfect state, I made no attempt to take the nest for several weeks, in order that the parasite might have full opportunity of establishing itself therein. For permission to delay the capture, and make it when I thought proper, I am indebted to the kindness and courtesy of Mr. Walter Strickland, a gentleman every way worthy of the name he bears, the owner of the Cokethorpe estate, and a near relative of the late lamented and never-to-be-forgotten Hugh Edwin Strickland,

whose untimely death Science has every reason to deplore. In the mean time I matured the plan of attack and made the necessary preparations, having four objects in view, the first of which was to take the nest, the second to take it without running the risk of getting stung, the third to take it at the time Velleius would be likely to be found in it, and lastly to take it without destroying the insects belonging to it, so that the work might be carried on after I had got possession of it, which of course vastly increased the difficulties that had to be surmounted. My first care was to have two dresses made, one for myself and the other for the person I engaged to assist me, which should render the wearers proof against attack, even if by any accident the whole colony chanced to rush out in an infuriated state. These dresses were easily and quickly made, the two having occupied one pair of hands but a few hours. The legs, body and sleeves were of unbleached calico; the part from the shoulders upwards of lino, in order that the wearers might be enabled to see what they were about. They somewhat resembled a couple of sacks, with legs attached to the bottom, and sleeves inserted in the proper places for the arms. Each dress was made to reach, when put on, above the head and hat of the wearer, when a string could be passed round the top and there securely tied. Gloves of stout sheepskin, dressed with the wool on, were provided, and to these short sleeves were attached, which when drawn on could be securely tied over the sleeves of the dress. Large woollen stockings were also provided, which could be drawn over the boots and over the legs of the dress, and there secured by strings. A dress of this kind gives a feeling of perfect security to the wearer, thus enabling him to go to his work with confidence, coolness and self-possession: it is thus of some value, even if no accident occurs, in capturing insects of so formidable a character as hornets, while in case of accident its value is beyond calculation. A couple of long narrow lino bags, in which to place and bring away the captured insects, were got ready, and a glazed box, in which the work of the nest could be carried on, made, as also an apparatus for introducing the chloroform, consisting simply of a short tin tube, corked at both ends, with a small opening about the middle, the tube being about the size of a quarter-ounce bottle; it had a slight handle, three or four inches in length, and was loosely filled with cotton-wool: a quantity of soft and well-tempered clay was prepared, and on the evening of the 7th of September I met my assistant, by appointment, near the "scene of action," taking with me, in addition to the articles enumerated and described above, a bull's-eye lantern, matches, chloroform, mallet, chisels, saw, a small box in which to place the bag or bags of captured insects, and a "laurel-bottle" in which to place Velleius, if we chanced to be fortunate enough to meet with a specimen. It having become sufficiently dark, we proceeded to unpack our wardrobe and dress for the parts we were respectively about to perform. This done we made our appearance on the stage; I advancing with a mass—some might think "mess" a more appropriate or expressive term—of clay in one hand and bull's-eye in the other, and my assistant with clay in each hand: this we hastily deposited upon the entrance to the nest, which we forthwith began to plaster up, but as

"There are more things in Heaven and earth, Horatio,
Than are dreamt of in your philosophy,"

so these insects had more places for

"Their exits and their entrances".

than we had dreamed of or had been able to discover: the consequence was that before we could succeed in cutting off all means of egress, some twenty or thirty individuals contrived to make their escape. Now, at this juncture, had we not been provided with armour, we should of course have bolted off and left the work at its very commencement, thus increasing the difficulties of capture whenever a fresh attempt should have been made; but feeling secure we stuck to our work till we had effectually closed up every aperture, and then quietly set about capturing the individuals that had so far made their escape; this we were soon enabled to do, as they continued to buzz round us or among the grass at our feet in an apparently bewildered state, making no attempt that we could discover to attack us; there is one thing, we took but little pains to ascertain the fact, it being a matter of perfect indifference to us whether they made the attempt or not. We "bagged" the lot, and then with a piece of stick about the size of one's thumb proceeded to make an aperture through the clay we had plastered over the principal entrance, leaving the stick in the aperture by way of "stopper" till the dose of chloroform had been prepared, which was pushed in the instant the stick was withdrawn, and the aperture through which it had passed immediately closed up. In a few minutes the drug had done its work, as we were enabled to ascertain by repeatedly striking upon the trunk of the tree near the nest, the first few blows being answered by a prolonged growl from the imprisoned insects, but the responses grew more and more faint, till at length they ceased entirely, and then putting off our armour we began to make active use of the mallet and chisel. From the decayed state of the tree the nest was soon reached, when the insects were found lying helplessly drunk underneath it, except a few which were in the same state between or on the combs; it was among the latter, immediately under the crown of the nest, the specimen of *Velleius* was discovered, the capture of which was recorded in my late notice (*Int.* viii. p. 188). It now only remained to "bag" the insects, to remove the nest to the interior of the glazed box, to convey it to its place of destination, to fix it when there in the place prepared for it, to suspend the nest properly inside it, to place food and building materials within it, and then to introduce the colony, which consisted of about one hundred individuals; all of which was accomplished without difficulty or the occurrence of any accident. The insects, which had recovered from the effects of the chloroform by the time the box was ready, were, partly by persuasion and partly by force, passed into it through an aperture made for the purpose, and which was afterwards closed with a cork. The aperture by which they were allowed to pass out, through an opening in the window, was closed with a sliding door, and this was not opened till all were found to have ascended into the nest, when the slide was withdrawn, and liberty was given them to go out and come in when they pleased. On entering the box they made themselves perfectly at home at once, pitching immediately into the good things I had provided for them, and as soon as daylight appeared setting to work as quietly as though no change whatever had taken place either in their circumstances or situation.—*S. Stone* (*in the 'Intelligencer'*); *Bright-hampton*, October 7, 1860.

The 'Annual' for 1861: "New British Coleoptera."—

Bradycellus harpalinus, Dej. I believe I was the first to record the distinctions of this species (*Ent. Intel.* viii. 59), but not having the advantage of a correspondence with our continental correctors I was unable to name it. The above seems to have escaped the notice of the compiler of the references, although a similar record by me

in last year's 'Intelligencer' was dignified with a place in the 'Annual' for 1860. I ought not, however, to be astonished at the omission, as I have since that time, in the natural order of events, become included in the list of entomologists obnoxious to Mr. Janson (*i. e.* eleven-twelfths of the known coleopterists),—a calamity which I of course deplore, but survive. I remember in May last showing the species in question to that gentleman, who then professed ignorance of its name. I possessed an example, and had remarked its peculiarities, before the 'Annual' for 1860 was published; but my attention was more particularly drawn to it by the remarks in Dr. Schaum's paper, conspicuous, by the way, for the very positive nature of its statements, and a certain lack of courtesy to the authorities corrected.

Bagöus nodulosus, Schön. With regard to this species I must acknowledge and correct a mistake (Zool. 7266). The penultimate sentence of my notice should have been, "B. binodulus has on each elytron *two* knobs, and B. nodulosus only *one*." I can only account for the error by the unorthodox way in which my figures are generally written: had the words been at full length the printer could not have made a mistake. I did not see the November number of the 'Zoologist' until my attention was drawn to it by the quotation in the 'Annual,' otherwise I should have corrected it at once. Mr. Janson's remarks as to the size of the species are correct, but quite unnecessary, since it was the large size of my insect that induced me at first to refer it to B. nodulosus, which Schönherr states is nearly as large as B. binodulus. Any strictures, however, of this kind might have been avoided if Mr. Janson had condescended to examine the specimen when I exhibited it at the Entomological Society. The extract also, from the 'Proceedings,' is not exactly in my words. I exhibited the insect as "certainly a new British species, which I had not yet had an opportunity to refer to its specific name." The objection taken by Mr. Janson to my statement that the elytra of B. binodulus were "merely punctured" is not worth much, my obvious meaning being that they were so in comparison with the rougher granulations of the species I described: my words were in accordance with Schönherr's description, and my insect agreed in every point with his B. nodulosus. The other differences between the two species remarked by me were not referred to, because they could not be contradicted I presume. I have no doubt but that the species recorded by me is really the *Bagöus nodulosus* of Schönherr, and I have opinions to this effect from gentlemen on whose authority I should place reliance in preference to that of our self-constituted judge, even if the latter had seen and examined my specimen, a somewhat necessary preliminary to a correct verdict, but which he did not take the trouble to do when he had the opportunity. The prejudice and want of courtesy displayed in the articles on Coleoptera in the 'Annuals,' and the way in which they have been ingeniously distorted into a vent for personal ill-feeling and self-glorification, must, I think, give foreign entomologists, and the public in general, a curious but erroneous idea of the state of the science in England.—*E. C. Rye*; 284, *King's Road, Chelsea, S.W.*, January 8, 1861.

Beetle Musicians.—During our ride home [in Tobago] I was startled by hearing what I fully imagined was the whistle of a steam engine; but I was informed it was a noise caused by a beetle that is peculiar to Tobago. It is nearly the size of a man's hand, and, fixing itself against a tree, it commences a kind of drumming noise, which gradually quickens to a whistle, and at length increases in shrillness and intensity, till it almost equals a railroad whistle. It was so loud that, when standing full twenty yards from the tree where it was in operation, the sound was so shrill that

you had to raise your voice considerably to address your neighbour. The entomological productions of the tropics struck me as being quite as astonishing in size and nature as the botanical or zoological wonders. There is another beetle, called the razor-grinder, that imitates the sound of a knife-grinding machine so exactly that it is impossible to divest oneself of the idea that one is in reality listening to some "needy knife-grinder" who has wandered out to the tropical wilds on spec.—'Romance of Natural History,' by P. H. Gosse, p. 29.

Haunts of Leptinus testaceus in Scotland. — Until 1857 this interesting beetle had occurred to British coleopterists only, I believe, in single specimens, and at considerable intervals of time. In the last week of August of that year I was fortunate enough to pick up, with the help of a young friend, and within the compass of a square yard, twenty-three individuals, the majority of which have long since found their way into the cabinets of correspondents. While walking through a damp wood in Berwickshire, a few chips that had lain for twelve or eighteen months invited my inspection; and in the hope of meeting with *Quedius lateralis* and *Q. attenuatus* I commenced a search. After turning a chip or two, and slightly disturbing the heap, I observed a creature issue forth at some distance from my hand, and, careering for a second or two with many-twinkling feet in the bright sunshine, vanish beneath the *débris*, again to return and display its yellow silky sheen, convincing me it was no vulgar mite, as for a moment I supposed, that had been startled from its propriety. The heap was moderately dry, being drained by the gallery of a field-mouse or a mole, out of whose subterranean abode several specimens were extracted. Two or three individuals had attached to their legs what I regarded as the larvæ of an *Acarus*. The spot was visited the two following years, but without success, the habitat having been destroyed by the tread of cattle. At a short distance from it, however, I took a single specimen on a very unfavourable day in September last, amongst decaying leaves and twigs, in company with species of *Catops* and *Megarthus*. This note, along with the information that Mr. Scott will probably furnish regarding the locality of his late capture, may possibly help some young collector to the possession of what I presume is still a desideratum in many a cabinet.—*Robert Hislop; Blairlodge, Falkirk, November 24, 1860.*

Occurrence of Ammæcius brevis at Southport, and Notes on other Coleoptera. — In the month of May, 1859, I enjoyed the satisfaction of a week's collecting in the sand-hill district near Liverpool, extending my researches to Southport. This last-named station proved by far the most productive I had met with. It was that propitious moment when the insect world is assuming its most active phase of existence, and the influence of a noon-day sun had called forth an infinite number of Coleoptera to bask on those white and gleaming slopes; not only affording me some rare acquisitions, but matter for interesting observation with regard to the habits of species. I was particularly pleased in noting that lovely insect, *Carabus nitens*, as he appears at home. Standing in the middle of one of those damp spots in the heart of the sand hills, which it appears most to affect, the eye, attracted by the metallic gleam, could discover a dozen or more individuals, each standing perfectly motionless at the edge of his burrow, a little heap of sand newly raised indicating the point of exit. So long as the sun continued to shine they quietly submitted to capture, but the moment a passing cloud obscured it they retreated at once to the earth. Skirting situations like these among the procumbent stems of a species of *Salix* very common in maritime localities, I took, by a vigilant chase, several specimens of *Tachypus pallipes*. This insect, like that before mentioned, I could never succeed in taking but when the sun

was shining. Climbing the smooth and yielding surface of the sand, I met here and there with a specimen of a small steel-blue *Saprinus*, which has proved to be the rare *S. quadristriatus*. Drifted by the sea-breeze and entrapped in hollows of the sand, I found innumerable specimens of *Ægialia arenaria*: of this species, the usual concomitant of sand hills, I furnished myself with an ample supply for distribution. On my return home, while occupied in setting these last, and reviewing the collective result of my efforts, I noted one specimen which, though casually included with the rest, when viewed with the glass presented a form and characters dissimilar to anything known to me. By favour of my friend Dr. Power, who at once decided it to be a new addition to our British fauna, the specimen was handed to Mr. Waterhouse for determination. It has proved to be *Ammœcius brevis* of Erichson, a genus not hitherto recorded in our lists, and nearly allied to *Ægialia* both in habit and appearance. Early in May of the present year (1860) I paid a second visit to Southport Sands, with special reference to the insect whose capture has furnished the immediate occasion of the present remarks. On this occasion I was fortunate enough to procure four more specimens, and I have little doubt, after this hint, that the zeal of our northern coleopterists will render the species accessible in the future. — *A. Haward; Gloucester Road, Croydon.*

Luminous Beetles.—A sight in every respect similar, though doubtless dependent on a different species, occurred to me in ascending the river Alabama from the Gulf of Mexico. As the steamer passed booming along under the shadow of night, the broad belt of reeds which margined the river was thronged with myriads of dancing gleams, and the air was filled with what looked like thousands of shooting stars. Beautiful, however, as these spectacles were, I had not known what insects could effect in the way of illumination till I visited Jamaica. There, in the gorgeous night of a tropical forest, I saw them in their glory. In the glades and dales that open here and there from a winding mountain road cut through the tall woods, I have delighted to linger and see the magnificent gloom lighted up by multitudes of fireflies of various species, peculiarities in whose luminosity—of colour, intensity and intermittence—enabled me to distinguish each from others. I delighted to watch and study their habits in these lonely spots, while the strange sounds, snorings, screeches and ringings, of nocturnal reptiles and insects, were coming up from every part of the deep forest around, imparting to the scene a character which seemed as if it would suit the weird hunter of German fable. There are two kinds in particular, of larger size than usual, which are very conspicuous. One of these is more vagrant than the other, shooting about with a headlong flight, and rarely observed in repose. Its light appears of an orange hue when seen abroad; but it frequently flies in at open windows, and, when examined under candle-light, its luminosity is yellow: when held in the fingers the light is seen to fill the hinder part of the body with dazzling effulgence, which intermits its intensity. The other is more commonly noticed resting on a twig or leaf, where it gradually increases the intensity of its light till it glows like a torch; then as gradually it allows it to fade to a spark, and become extinct; in about a minute, however, it begins to appear again, and gradually increases to its former blaze; then fades again; strongly reminding the beholder of a revolving light at sea. The hue of this is a rich yellow-green; and sometimes a rover of the former species will arrest its course, and, approaching one of these on a leaf, will play around it, when the intermingling of the orange and green lights has a most charming effect. In the lowland pastures of the same beautiful island there is another insect abundant, of much larger dimen-

sions, which displays both red and green light. On the upper surface of the thorax there are two oval tubercles, hard and transparent, like "bull's-eye" lights let into a ship's deck; these are windows out of which shines a vivid green luminousness, which appears to fill the interior of the chest. Then on the under surface of the body, at the base of the abdomen, there is a transverse orifice in the shelly skin, covered with a delicate membrane, which glows with a strong ruddy light, visible, however, only when the wing-cases are expanded. During the dark nights it is most interesting to mark these large beetles flying along over the herbage at the edges of the woods and in the pastures; the red glare, like that of a lamp, alternately flashing upon the beholder and concealed, according as the insect turns its body in flight, but the ruddy reflection on the grass beneath being constantly visible as the animal leisurely pursues its course. Now and then the green light from the upper "bull's-eye," which seems to be under the insect's control, is displayed, and then again the mingling of the two complementary colours, red and green, in the evolutions of flight, is indescribably beautiful.—'Romance of Natural History,' by P. H. Gosse, p. 35.

Habits of Sagra.—I wonder if Mr. Baly is aware of the use of the large hind femora and strong curved tibiae of Sagra? As he may never have seen Sagra living, I will give him my experience of that beetle. I speak of *S. femorata*, which is common in the South of China, though I never saw it north of Shanghai. It comes nearest *Eulmolpus*, and, like that resplendent genus, it is indolent and sluggish, delighting to perch itself in the sun on a topmost twig; and the use to which it puts its kangaroo legs is simply to enable it to obtain a firm grasp of the stick in its elevated position. There it remains, looking very tempting and pretty; but no sooner is the hand stretched forth to secure the prize than down drops Sagra in the tangled bush, and may no more be discovered than the much-talked-about needle in the bundle of hay. When all again is quiet it again begins its slow laborious ascent. The motto of Sagra is evidently "Excelsior."—*Arthur Adams.*

The Hexagonal Form of the Cells of Hive Bees.—Mr. Hawkes (Zool. 7292) has endeavoured to prove that these cells are not as above stated. Let Mr. Hawkes examine one of the small honeycombs often made by bees in wet weather, or by weak hives, and he will soon be convinced that the theory of pressure to alter the form is far fetched. As he justly says, the hive-bee honeycomb is one of the most wonderful things in the volume of Natural History. I regret to see sometimes (not in Mr. Hawkes's case) that an over zeal for new theories and new discoveries often leads men to go out of the right direction; and I think in the case of these wonderful insects, the bees, this too often takes place. It has been clearly proved that the hexagonal form of the cells cannot be improved, and that this form has the greatest economy of space, the greatest symmetry as well as strength, and perfect adaptation to its purpose, more than any other which man could conceive. The bees, as Virgil said of old, fully display, in this, "partem Divinae mentis." In illustration I quote the words of the late William Kirby, in his work entitled 'Monographia Apum Angliæ,' where, in describing some of the curious sorts of wild bees, he says:—"Who is it that instructs them to bore a fistular passage underground, or in the trunk of a tree, for the reception of their nests? What rule do they take with them to the shrub from which they borrow their materials to assist them in meting out their work, by which they cut some pieces into portions of an ellipse, others into ovals, others into accurate circles, and to suit the dimensions of several pieces of each figure so exactly to each other? Where is the architect who can carry, impressed upon the tablet of his memory, the entire idea

of the edifice he means to erect, and, without rule, square, plumb-line or compass, can cut out all his materials in their exact dimensions, without making a single mistake or a single false stroke? And yet this is what these little animals do invariably, and thus teach us how much more wonderful and certain instinct is than all the efforts of *our* boasted reason, which cannot attain certainty, and which these creatures manifest spontaneously, working at all times with unerring precision. What is this teaching but the manifestation of the eternal wisdom of the Creator infinitely diversified?" I recommend Mr. Hawkes to extract a small piece of empty comb, of which there is abundance this most untoward season, from one of his swarms of 1860, and where no pressure can have existed, and he will not fail to be convinced that the new theory of a different shape than hexagonal to the hive-bee cell will be found completely in error.—*H. W. Newman ; Hillside, Cheltenham, December 4, 1860.*

Notes on the Family Phryganidæ. By EDWARD PARFITT, Esq.

THE following are extracts from my notes on the appearance and continuation of some of those species of Phryganidæ observed and taken by me in the neighbourhood of Taunton, Somerset, in 1860. They follow in order of date as taken.

Brachycentrus subnubilus. First observed April 26, and disappeared about the 10th of May. Common along the river.

Cyrnus pulchellus. May 6 to June 24.

Agapetus funereus. Male and female, May 9.

Notidobia ciliaris. May 12, very common. In addition to the characters given by Stephens and Dr. Hagen, add "*a white line along each side of the abdomen.*" Continues to end of June.

Sisyra fusca. May 19.

Sericostoma Spencii. May 23 to the end of June, common. Add to Dr. Hagen's description, "*Tibia slightly spinose inside.*" This species has also a white spot at the inner angle of the wings, in some specimens more conspicuous [in life]. The males and females are equally common, which is not the case with many species.

Silo pallipes. May 24, not common.

Phryganea grandis. Rare. May 24 to June 20.

Tinodes luridus? May 24.

T. pallescens. May 24 to August 28 *passim.*

Limnophilus pellucidus. May 24, not common.

Leptocerus annulatus? This has been compared by Mr. M'Lachlan with the specimens in the British Museum; and he, with myself, is doubtful if this be the true *L. annulatus*, but is inclined to think it a new species very nearly allied, as it differs somewhat from the types. Taken May 30.

- Polycentropus trimaculatus*. May 31, common.
- Limnophilus rhombicus*. May 30, common.
- Leptocerus Auricula*. May 31.
- Limnophilus marmoratus*. Bred. June 3, very common.
- L. hirsutus*. June 1 to June 23, not common.
- Mystacides nigra*. June 1.
- Leptocerus aureus*. June 1, rare.
- L. dissimilis*. June 1 to August 6, scarce. Add, "Abdomen pale green in the female, brown in the male".
- Mystacides quadrifasciatus*. June 1 to October. I have taken a variety of this with pale concolorous wings.
- Odontocerus albicornis*. June 2.
- Agapetus ciliatus*. June 2.
- Limnophilus marmoratus*? A rather remarkable variety, with entirely green abdomen, or in some slightly clouded with a whitish line along the spiracles; the anal appendage broadly ovate at the base and very acuminate, running out into a longish spine ciliated on the margins. June 3.
- L. vitratus*? In addition to Dr. Hagen's description, add, "The apical lobe of the last segment of the abdomen set with decumbent black bristles."
- Leptocerus nervosus*. June 3, not rare.
- Rhyacophila dorsalis*. Rare, June 5.
- Hydroptila pulchricornis et tineoides*. Taken *in cop.*, June 14. (See Zool. 7111, for further remarks on these so-called species). There appear to be two broods, as they disappear after about a month, and towards the end of August and beginning of September they are again seen in some numbers, though not so numerous as the first brood.
- Leptocerus tineoides*. June 15.
- Mystacides ater*. Stephens's description of this species is very correct. Dr. Hagen does not appear to mention it; if he does, there is some confusion, and it seems difficult to clear it up. June 15, scarce. But more of this anon.
- Setodes elongatus*. Bred. June 15. Dr. Hagen says, "Case like that of *Mystacides*, according to Kolenati." The case of *S. elongatus* is small, slightly curved, and with the larger end straight, not curved outwards like the mouth of a trumpet; it is composed of a horn-like matter—similar to the polypidoms of zoophytes, the genus *Tubularia* for instance—mixed with a very fine silk-like substance, which gives the case a transversely striated appearance under a lens.

Leptocerus bimaculatus? This was examined by Mr. M'Lachlan, who says it is not *L. bimaculatus*, and, after hinting that it may be *L. perfuscus*, suggests that it is probably a new species. It certainly is not *L. perfuscus*. June 19, scarce.

Goëra capillata. June 19.

Agraylea multipunctata. June 20, one specimen only.

Polycentropus subpunctatus? June 20, not common. A variety with the nervures of the wings concolorous, and the wings themselves nearly black, led me, at first, to regard it as a new species.

Leptocerus bifasciatus. This beautiful and very scarce species was taken by a rapid stream near the old Roman bridge, Taunton, July 8.

L. albifrons. July 23, scarce.

Limnophilus vittatus. August 27, scarce.

Anobolia nervosa. September 18 to October 24. I met with a curious variety of this species, a male and female, the male having the inner apical portion of the anterior wings cut out, similar to those of *Limnophilus pellucidus*; the female has the ordinary wings of the species. If I had captured the male alone I might have been led into error, but taking them *in cop.* settles the question I think.

Beræa albipes. September 19.

Halesus digitatus. October 2, not common.

Limnophilus auricula. October 12, not common.

I may mention, in conclusion, that I have four new species of this order, at least they are not in the British Museum. They are in the hands of Mr. M'Lachlan, to be forwarded to Dr. Hagen for his opinion. I have also three species of the genus *Baëtis*, and one of *Cœnis*, not described by Stephens. I believe these genera are very imperfectly known, at least the British species.

EDWARD PARFITT.

Devon and Exeter Institution, Exeter,
January 20, 1861.

Habitats of Sea Anemones. — To those of your readers who are interested in and collect sea anemones it may be useful to give a locality for *Actinoloba Dianthus* not mentioned in Mr. Gosse's charming work on 'British Sea Anemones.' I found this beautiful species in October, in considerable numbers, adhering to the large boulders and stone-work beneath the unfinished pier at Lowestoft, in company with quantities of *Aleyonium digitatum* of all sizes. The tide was not low enough for walking, but by taking a boat and rowing along the base of the pier, as the tide receded, we found them anchored to the stone-work. None were found on the harbour side of the finished pier, but on the ocean side of it they were plentiful. There was great variety in size,

some being very large and full blown, others small and budding. Of the varieties described by Gosse were *brunnea* and *rubida*. I may also mention, for the benefit of any lovers of sea anemones who may visit the Isle of Wight, that of *Actinia Mesembryanthemum* (the variety *fragacea*) Freshwater Bay is quite a "strawberry bed." There also may be found good specimens of other varieties, such as *tigrina*, *olivacea*, *hepatica*, &c. *Bunodes Ballii* and *Anthea Cereus* are also to be found there; this last is also very abundant between Shanklin and Sandown, where also may be found *Sagartia Troglodytes*, *S. bellis*, and, though not very abundantly, *Tealia crassicornis*. This last, and *S. Troglodytes* in several varieties, are also found on the shores of the Solent, opposite the Isle of Wight.—*J. Pemberton Bartlett.*

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

January 7, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘*Tijdschrift voor Entomologie*,’ Vol. iii. Part 4; presented by the Entomological Society of the Netherlands. ‘*Abhandlungen de Mathemat-Physikalischen Classe der Koeniglich Bayerischen Akademie der Wissenschaften*,’ Vol. viii. Part 3. ‘*Denkrede auf Alexander von Humboldt*;’ ‘*Sitzungsberichte der Königl. bayer Akademie der Wissenschaften zu München*,’ 1860, Part 3; by the Academy. ‘*Kongliga Svenska Fregatten Eugenie's Resa omkring Jorden Insekter*,’ Parts 2 and 3; by the Académie Royale des Sciences de Stockholm. ‘*Papers and Proceedings of the Royal Society of Tasmania*,’ Vol. iii. Part 2; ‘*Report of the Royal Society of Tasmania*’ for 1858; by the Society. ‘*Proceedings of the Royal Society*,’ Vol. x. No. 41; by the Society. ‘*British Butterflies: Figures of every Native Species, with an Account of Butterfly-development, Structure, Habits, Localities, Mode of Capture and Preservation, &c.*,’ by W. S. Coleman; by the Publishers, Messrs. Routledge, Warne and Routledge. ‘*Monograph of Halticidæ in the Collection of the British Museum*,’ by the Rev. Hamlet Clark, M.A., F.L.S., *Physapodes and Œdipodes*, Part 1; by the Author. ‘*Exotic Butterflies*,’ Part 37; by W. W. Saunders, Esq. ‘*The Zoologist*’ for January; by the Editor. ‘*The Journal of the Society of Arts*’ for December; by the Society. ‘*The Athenæum*’ for December; by the Editor. ‘*Catalogue of British Coleoptera*,’ by G. R. Waterhouse, Esq., F.Z.S., &c., Sheets m and n, two copies; by the Author. ‘*The Entomologist's Annual*’ for 1861; ‘*The Entomologist's Weekly Intelligencer*,’ Nos. 218 to 222 inclusive; by H. T. Stainton, Esq.

Election of a Member, &c.

Francis A. Jesse, Esq., of Lanbedr Hall, Derbyshire, was elected a Member; and W. F. Kirby, Esq., of 25, Albert Street, Mornington Crescent, and H. W. Bates, Esq., of King Street, Leicester, were elected Subscribers to the Society.

Exhibitions.

Mr. S. Stevens exhibited some splendid Papilios and other Lepidoptera sent from Ceram by Mr. Wallace.

Mr. Shepherd exhibited a fine dark variety of *Hemerophila abruptaria*, taken near London.

Mr. Bond exhibited some fine varieties of *Dictyopteryx uliginosana* and *Gelechia subdecurtella* from the Cambridgeshire fens; also a fine series of *Gracillaria stigmata*, one example being nearly pure white.

Mr. M'Lachlan exhibited an example of *Setodes interrupta* of Fabricius (*non* Stephens), taken near Taunton by Mr. Parfitt, in 1859; and remarked that this phryganidous insect may be considered as new to Britain, for although Fabricius, in 1792, indicated it as occurring in England, no one appears to have rediscovered it until now.

The Rev. H. A. Pickard exhibited a specimen of *Gonepteryx Rhaunni*, *var.* *Cleopatra*, taken by John Fellerton, Esq., at Thybergh Park, near Rotherham, on the 27th of June, 1860, being the first recorded British example of this beautiful variety.

Mr. Scott exhibited some specimens of *Mycetophagus 4-guttatus*, *Müller*. The species had been lately found in decaying pea-haulm, by Mr. Douglas and himself. In all about fifty specimens had been secured.

Dr. Knaggs exhibited some eggs of *Geometridæ* from which hymenopterous parasites had emerged.

Mr. Westwood pronounced these parasites to be *Platygaster Ovulorum*.

Mr. Gorham exhibited examples of *Micropeplus staphylinoides*, *Marsham*, and *M. Margaritæ*, *Duval*, and made the following remarks:—"I believe under the specific name of *staphylinoides* two species of *Micropeplus* have been generally mixed in British collections; they are the true *M. staphylinoides* of Marsham, and *M. Margaritæ* of Duval. I have therefore attempted to point out the characters by which these species may be separated. In *M. staphylinoides* the elytra are scarcely a third longer than the thorax; their sides are parallel, and the fourth segment of the abdomen is armed with an acute prominent crest: in *M. Margaritæ* the elytra are longer, being nearly half as long again as the thorax, their sides rounded, and the disk more convex than in *M. staphylinoides*; the fourth segment of the abdomen with a small and not conspicuous tubercle. I also beg to call attention to the sexual characters which *M. Duval* has pointed out, but which appear to have escaped the notice of former authors, viz., the existence of a tooth on the tibia of the male. In *M. staphylinoides* the head of the male is produced into a tooth in front; that of the female is rounded: in *M. Margaritæ* the head of the male is more acutely toothed; that of the female rounded. In this respect they may both be separated from the nearly-allied species, *M. longipennis*, *Kraatz* (*M. staphylinoides*, *Ktz.*, olim, nec *Marsh.*), which has the head rounded in front in both sexes."

Mr. Ellerton exhibited some pupa-cases of *Cerura vinula*, showing the thin membranous lining alluded to at the last Meeting of the Society (Zool. 7335).

Mr. Westwood remarked that these delicate white pellicles, seen attached to the inner surface of the cast skins of lepidopterous pupæ, were probably identical with the skin said by Mr. Curtis to be cast by the death's-head moth after assuming the perfect state. A more careful examination of these pellicles was, however, necessary, as the question really was whether the *Lepidoptera* on emerging from the pupa cast one or two envelopes,—whether, like the *Ephemera*, they were enveloped in two distinct skins, as indeed the statement of Mr. Curtis implied, thus partially resembling the coarctate *Diptera*, in which, however, the outer skin of the pupa is only the hardened ultimate skin of the larva; or whether the limbs of *Lepidoptera* are not respectively

enclosed in a single sheath, the outer surface of which becomes hardened by a glutinous secretion, by which the whole are fastened together into a solid mass.

Mr. Fereday exhibited a living larva, apparently of *Triphæna pronuba*, which had been found, a short time previously, lying on the snow with which the ground was then covered, and frozen quite hard, but on being removed to a warm room quickly became active.

Mr. Waterhouse exhibited a new British species of *Scydmanus*, and a series of the British *Euplecti*, and read some notes on their differential characters.

Mr. Scott exhibited a new species of *Coleophora*, and read a description of it, proposing for it the specific name of *Wilkinsoni*, the insect having first been discovered by Mr. T. Wilkinson, at Scarborough.

Mr. M'Lachlan observed that he had found the larva-cases of this species at Dulwich Wood.

How to cure Grease in Insects.

Dr. Wallace read the following paper :—

“The Rev. Joseph Greene has given us (Zool. 6692) his method of curing grease in insects. Other entomologists extract the interior of greasy bodies, with very fine scissors, at a subsequent period after setting, whenever signs of grease are evident. I propose another method, more economical of time, equally certain in action.

“Small greasy insects—as *Tineidæ*, *Tortricidæ*, *Crambidæ*, small *Geometræ*, *Pyralidæ* and *Bombycidæ*—I soak entire in benzole. Of all large insects which may even be suspected of grease, having disarticulated the bodies from the thorax, and labelled according to the plan suggested by Mr. Greene—either of a year's capture or of many years' collecting—I expose such (bodies) to the heat of the fire, on a cork placed at about six inches distance; and if the grease has previously run into the thorax and spread over the wings, such parts must be further soaked in the manner above recommended for the smaller insects. By exposure on a cork to the fire, the grease, being liquefied and permeating the body, shows itself on the exterior, causing softening and a dark discoloration; if no such action takes place there is no amount of grease in the interior of the body, and no need to slit open the body as hereafter described. Simple soaking for a few days in benzole will remove the small portion of grease which may be deposited on the exterior of the insect.

“When discoloration and softening ensue, I slit open the body on the under surface and soak in benzole for twenty-four hours; then, taking say a hundred or more bodies, I boil them as rapidly as possible in about an ounce or more of benzole (adding a little from time to time) in a water bath, which may be easily composed of a saucepan containing water, in which is placed the covered jar containing the benzole and the bodies. In this process that portion of benzole which had previously soaked into the interior of the slit body, having been brought into close relation with the grease so as to dissolve it, is very readily volatilised; bubbles of gas are seen to effervesce rapidly from the body, currents of boiling benzole rush into and out of the slit body, and the grease is literally washed out. This may be best observed by boiling a single body with a drachm of benzole in a test-tube over a spirit lamp: but if the body be soaked, and not boiled, the benzole in the interior of the slit body dissolves the fat; but, while drying, it percolates slowly through the substance of the body, and deposits again in the interior nearly the whole of the grease previously dissolved, that portion only being

got rid of which, being on the exterior layers, is in immediate relation with a surrounding stratum of benzole. The quicker the boiling, the more readily is the grease washed out, but the greater the volatilisation of benzole.

"The bodies are now removed from the hot liquid, washed with fresh benzole, dried on blotting paper, and if exposed again to the action of heat will show no signs of grease. It will be found necessary to test a single body from time to time, the period necessary to extract all the grease varying according to the rapidity of boiling, the strength and purity of the benzole, and the amount of grease in the bodies. The bodies are finally attached each to its corresponding thorax with Canada balsam, liquid glue or gum.

"I think I may safely state that insects thus treated will never grease again.

"This process may be performed in the winter months, when all greasy insects can be cleaned together. It is economical in time and labour, and thorough in its action: it interferes very little with the beauty of the insect.

"That the body is the sole seat of grease is shown by taking a fresh-dried specimen of an insect liable to grease, as *Nonagria Typhæ*. Disarticulating the body, expose both it and the thorax and wings to the same amount of heat; the body will quickly discolour; the rest of the insect will remain unchanged. Bodies, therefore, should be always heated, while the head, thorax and wings are as yet free from signs of grease. If any doubt occurs as to the question of grease in an insect, its presence is readily tested by the exhibition of the body on a cork placed about six inches distant from the fire. Only very greasy bodies need be boiled; simple soaking will suffice for slight cases. When bodies are very small the passage of a pin breaks them unless soft with grease; I therefore prefer to soak the whole insect as above described."

Dr. Wallace subsequently boiled some greasy bodies of *Nonagria Typhæ* in benzole contained in a test-tube over a spirit-lamp, and exposed the bodies thus boiled, and others which had not been subjected to the process, to the heat of the fire: the former were unaffected by it, but the latter were rapidly discoloured and became soft.

Mr. Westwood communicated some notes on the time of appearance, in the perfect state, of *Acherontia Atropos*, furnished by Mr. W. Groves.

Mr. M'Lachlan read a paper intitled "Notes on the Genera *Mystacides* and *Setodes*, in the second part of Kolenati's 'Genera et Species Trichopterorum,' with reference to the Species described in the works of Messrs. Curtis and Stephens."
—*E. S.*

Frozen Rats. — As two gentlemen were skating on the river Wharfe, near Otley, they discovered six dead rats partially embedded in the ice. The heads of the animals were all pointed in one direction: they seemed to have been stopped in their course by the intense frost. They appeared at the time of their stoppage to have been crossing from the Farnley to the Otley side of the river: one of them, like a brave general, had taken the lead in the fatal enterprise, and the second was a little in advance of the rest, which were following closely up in couples.—*Local Paper.*

Postscript to 'Notes on the Fauna of Shetland.' — In reference to my paper on the Fauna of Shetland (Zool. 7337), permit me to observe that I was quite ignorant of the fact that a similar list had already appeared in the pages of the 'Zoologist.' Dr. Edmonston, my kind host, and the father of the late Mr. T. Edmonston, besides much valuable oral information, allowed me to make use of some printed papers of his own on the Ornithology of Shetland, and which I imagined to be the only ones in existence: I cannot help adding, however, that my paper was in the hands of the Editor for three months, during which time I might easily have received notice of my omission. A few errata should be noticed: p. 7338, line 13 from top, for "young of what are called sillocks" read "young of the coal-fish, which are called sillocks;" p. 7343, the local name for *Uria grylle* is "tystie," not "tyrtie;" p. 7345, for the stormy petrel the name is "spency." I observe that Mr. Doubleday doubted the occurrence of *Totanus hypoleucos* in Shetland in winter. I cannot, it is true, prove the statement; but as undoubtedly many birds come both from the North of Scotland as well as from Iceland to winter in Shetland, on account of its high winter temperature, I think it very possible that the summer snipe may thus remain, or be replaced by others from colder latitudes. — *W. D. Crotch; Uphill House, Weston-super-Mare, February 4, 1861.*

[Mr. Crotch was absent on the Continent during the interval, and two or three letters which I had occasion to write to him remained unanswered on this account. The publication of his paper was deferred some weeks, in the hope that I should be able to refer him to Mr. T. Edmonston's paper on the same subject.—*E. Newman.*]

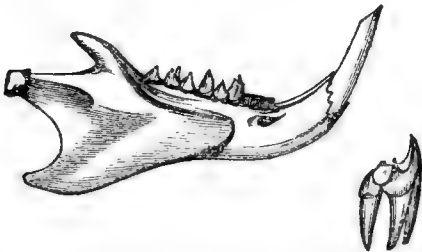
Halichærus "At Home." — If you have never seen seals in the privacy of domestic life, living unmolested in their island home, I would recommend you to visit Todomosiri, in the Gulf of Tartary. As, however, that little spot is a very long way off, I will endeavour to give you some idea of one of those wild scenes in wild out-of-the-way places where whalers put in for water, and take the same opportunity of knocking on the head a few hundred seals to complete their cargo. The small barren islet called Monneron by La Perouse, and Todomosiri or Seal Island by the Japanese, is situated on the north side of the west entrance to La Perouse Strait. It is a huge mass of bare trachyte, a steep weather-stained rock rising 1500 feet abruptly from the sea, and with some detached rocks on its eastern side. A great brown gull, greedy for fish-bones and offal, hovers round the base; a lonely cormorant, with outstretched neck, is drying her expanded wings on the salient angle of a black crag, and a little hawk is soaring high above the summit. These are the only birds; oysters, mussels and limpets are the only mollusks; a carrion-beetle, a large black *Silpha*, is the only insect met with. The other inhabitants are seals. Many of these are swimming and diving around the island, as is shown by uncouth red-brown heads showing now and then above the surface of the water; others are basking in the sun, motionless on the broad smooth rocks, the remnants of their fish-dinners strewn about them. The bones of some which have died from old age or wounds are bleaching in the wind, and the carcasses of others are seen decomposed, and torn by gulls and cormorants. The dirt, stench and strange company, with the wild great rocks towering all around, produce an impression certainly novel, but not altogether agreeable. We are anchored pretty close under the lee of the island, and directly opposite the ship is a little white shingly

cove, with patches of long coarse reedy grass in the background. This is a favourite resort of the seals, and here their manners and customs may be always studied. The old gray bulls rear the fore part of their bodies and slowly sway themselves from side to side, meanwhile throwing up their great heads and bellowing continuously. The cows and their calves are congregated together in a coterie by themselves, and on the outlying rocks repose, in attitudes anything but graceful, an entire seraglio of young females. The noise of the seals in the night is something fearful: it is like the croaking of Brobdignag bull-frogs, varied at intervals by deep growls and sharp cries, low-muttered curses, snortings, dissonant brayings, and other sounds even more unearthly still. Three individuals fall victims to the prowess of our sportsmen, and are towed on board in triumph. From the simple pointed molar teeth of the upper jaw, and by other characters, I make them out to be a species of *Halichærus*, very possibly *H. barbatus*.—*Arthur Adams*.

Cat taking the Water.—A man in my employment, who lived in an adjacent cottage, had a fine tortoiseshell cat, which was not only an excellent mouser, but was also extremely fond of the flesh of water-rats and moorhens. In pursuit of these she was frequently observed to plunge into the water, and seldom failed to bring out a prize.—*Jonathan Grubb*.

Hedgehogs.—We have hedgehogs constantly in our garden; and during the late wet summer (1860) I observed that they had been very busy at night on the lawn rooting, so as quite to disfigure it; but I could not perceive that it was the plantain roots that attracted them, as mentioned by Gilbert White. I rather thought, from the appearance of the holes, that worms were the object of their search. I have frequently pursued them in the dusk on a summer's evening, and found that so long as I kept at a moderate distance they continued to run pretty fast, but as soon as I got up to them they immediately sought safety by rolling themselves up and concealing all the tender parts within their prickly armour. It was pleasing then to watch at a little distance the cautious manner in which they unrolled themselves and made off to the nearest cover.—*Id.*

Note on Spermophilus erythrogonoides, Falconer, a new Species of Marmot.—I have much pleasure in presenting a sketch of the right ramus of the lower jaw of this new species of marmot. I have made the sketch from the jaw now in the Museum at Taunton. It has been to London, and compared by perhaps the greatest authority for cave-animal remains, Dr. Falconer. This gentleman informed me that he considered it then to be the jaw of *Spermophilus citellus*; but he afterwards found it to be not that species, but an entirely new one, to which he has given the above name. The specimen, which was bought by the Somerset Archæological and Natural-History Society, was in the late Mr. Williams's collection of Devonian fossils and cave-animal remains. The latter are from the Mendip caverns, and among them are some very fine specimens; one, a head of *Hyæna spelæa*, Dr. Falconer told me is the finest in Europe. These marmots, or ground-squirrels as they are called, were probably as plentiful in our limestone hills ages ago as they are now, scattered over the Old and New World. This animal, to



which the jaw belonged, although not precisely like *S. citellus* of the Altai mountains, to which it was first attributed, was no doubt the equivalent of that species inhabiting this intermediate space between the Old and New World; and it is my opinion that the climate of this country has not undergone any material change since these limestone hills of ours possessed those little creatures alive and in full activity. These may have existed, and probably did exist, even up to the time when man took possession of this island, and indeed may have been exterminated by him. As the other species of this family are used as food, these in all probability were used as food also. And if we picture the Altaï at the present time with what our Mendips and other ranges of limestone hills once were, we shall see a very great resemblance, both in its fauna and the crops which they both sustained around them. At the town of Fykalka, situated on the southern slope, at the height of 4000 feet above the sea, the land is cultivated with success, yielding barley, rye, oats, millet and summer wheat, besides garden vegetables. The little marmot, which inhabits these regions near the snow line, is preyed upon by the glutton: the bear, the wild sheep (*Ovis argali*), *Cervus Elaphus*, *C. Alces*, &c., climb about the craggy heights, while below roam the tiger, &c. Now, if we build up the bony structures which are found in these caverns of our hills, and clothe them with flesh and give them life,—the lions, hyænas, wolves, sheep and deer,—with *Elephas primigenius* and *E. antiquus* feeding on the young green boughs of the willows and birch, with perhaps *Bos longifrons* and *B. Urus* roaming in the boggy ground in the distance, and *Urocerus hibernicus* and *Strogylocerus spelæus* bounding across the plain, I think the picture of our Altai, the Mendips, may be compared to that of the Altai proper of the present time. What can have caused the death of so many animals in this country, both carnivorous and granivorous, when similar ones are living as it were in a similar condition to those which existed some years ago, is a problem I am not prepared to answer. They must have gradually died out from or through some, to us, unknown cause. I say gradually; and it must have been so, from the circumstance of the bones being found as it were in layers, or rather mixed with mould and dirt, in some places to eight or ten feet thick, just as the deer, &c., were hauled in to be devoured by bear or hyæna, which ever occupied the den; so that it is quite evident they were not destroyed by any sudden catastrophe, but that they gradually became extinct. A casual observer of these caverns would be led perhaps to other conclusions by their water-worn appearance inside,—an appearance which I cannot satisfactorily account for. The outside presents no particular worn appearance, but has the sharp angles familiar to every one who visits these hills.—*Edward Parfitt; Exeter, January 31, 1861.*

Occurrence of the Harvest Mouse (Mus messorius) in Banffshire.—Although the harvest mouse has long been considered an inhabitant of Banffshire, yet the fact, so far as I am aware, could never be satisfactorily established. Mr. Wallas Gardiner, of Greenskairs, parish of Gamrie, having occasionally seen on his property what appeared to him a curious and very small mouse, mentioned the fact to an acquaintance, who expressed a wish to see a specimen. Shortly afterwards two of the said mice were sent here for inspection, and proved to be the veritable *Mus messorius* of White, the very species which I had been so long and so anxiously in search of. Need I say with what delight my poor old eyes fell for the first time on these little gems of the quadruped world, or how long I looked at them, how often I turned and re-turned them, and with what tender care I stroked them? I may, however, mention that one of them—and they both seemed about the same—which I measured, and which is

now preserved in the Banff Museum, is scarcely four inches in length, tail and all; and its weight is only one-eighth of an ounce and thirteen grains! Well might the esteemed author of the 'Natural History of Selborne' say, "I suppose they are the smallest quadruped in this island," and he might have added "or perhaps on any other." Far be it from me to say aught against any mouse, or indeed against any animal whatever; but I cannot help thinking that these little creatures are the most elegant and pretty of their kind I have ever seen. From what I had read about the harvest mouse I was led to believe that it was of a reddish brown; but this I find not to be the case, at least with these, which are both adults: they are rather of a delicate glossy bay, except the belly, which is pure white.—*Thomas Edward; Banff, December 8, 1860.*

Nesting of the Griffon Vulture (Vultur fulvus) in Eastern Algeria.—A French "colon," who, when occasionally sober, plied the trades of carpenter and "chasseur," had offered to take us to some accessible griffons' nests. The rain was descending in torrents when we set out with our guide, and so dense were the clouds that it was impossible to detect even a griffon at two hundred yards. However, after some scrambling in the forest, we approached the edge of a long range of cliffs, from whose fissures and ledges many a mountain shrub and tree stretched forth and partially covered the nakedness of the rocks: carefully peering over the top, we soon espied, at a distance of some fifty feet below us, the cumbrous heap of sticks which generally serves the vulture for a nest; but were dismayed to see instead of an egg an unfledged downy squab. Had we come too late for nesting? It was an ominous disappointment to commence with. However, "Il y a de plus encore," cries our Frenchman, and we soon made out a second nest a little lower down the cliff. Alarmed by the falling of a stone, the parent bird deliberately rises, slowly stretches her wings, and, with two or three majestic wavings of her pinions, leaves a single egg disclosed to view. Having discovered a narrow ledge by which the nest may be reached, Simpson boldly descends, and reverentially handles the first griffon's egg he had ever seen *in situ*. But, calling out to us that he will wait till the complement has been laid, he clambers up to the top again. He has scarcely arrived there when the mother returns, and, quietly sailing in, lets herself drop on the edge of the nest. Here she pauses for a minute or two, grotesquely turns her neck and squints at her beloved egg, first with one eye, then with the other. Next she sniffs at it, turns it over and over, and with fond admiration, taking another look, seats herself down on it. It must be hard set, we remark, and Simpson, resigning hopes of any additional booty, determines to descend again and secure his prize. He had almost reached the nest before the parent bird would quit it: the egg proved to have been incubated for some time, and was the best-marked griffon's we obtained.—*H. B. Tristram, in the 'Ibis,'* ii. 362.

Occurrence of the Spotted Eagle (Falco naevius) at Lundy Island.—My friend Mr. Heaven, of Lundy, some three years since shot a specimen of the spotted eagle on the island; so that Mr. Rodd's bird is not the first which has occurred in the West of England.—*Murray A. Mathews; Raleigh; Barnstaple, February 1, 1861.*

Occurrence of the American Whiteheaded Eagle (Falco leucocephalus) in Somersetshire?—The following notice of the appearance, in Somersetshire, of the whiteheaded eagle may be interesting to some of the readers of the 'Zoologist.' It is extracted from

a letter just received from my son:—"Yesterday a curious ornithological event happened here. I was going to shut the rabbit-house door, when all the fowls came half flying down the yard, and hurried into the house. I guessed there might be a hawk, and, seeing the sheep also run under cover, I looked up, and there, not very high, but near enough for me to hear the flap of his great brown wings, was a whiteheaded sea eagle. Perhaps he was hungry, and had not met with his feeder the fish-hawk, and so was forced to come inland. He hovered awhile over our farm, and then turned his white head, and with one great flap of his wings went off over Bleadon Hill, and disappeared in the red sunset. I suppose he went to the Bristol Channel to fish for himself."—*Theodore Compton; Winscombe, Weston-super-Mare, January 25, 1861.*

Occurrence of the Whitetailed Eagle (Falco albicilla) at Weston-super-Mare.—A very fine young specimen of the whitetailed or sea eagle was shot here last week. Can this be the bird seen by Mr. Compton?—*W. D. Crotch; Uphill House, Weston-super-Mare, February 4, 1861.*

[I am always reluctant to throw the slightest discredit on statements made in good faith, and evidently without intention to mislead: but it does seem to me that the American eagle cannot be admitted into the avi-fauna of Britain on such unsatisfactory ground; and I feel quite disposed to admit Mr. Crotch's solution of the difficulty.—*Edward Newman.*]

A Domesticated Golden Eagle.—In my neighbourhood an half-pay surgeon of the navy had a golden eagle for three or four years in his farmyard, where it was an object of great attraction to visitors. It used to fly all over the country, and was sometimes absent for a couple of days at a time. At last it was shot by a farmer, from whose premises it was carrying off a hen. It never did any damage at home, where it was always well fed; nor did I ever hear of its attacking any person, although it occasionally used to show its displeasure, when disturbed by visitors, by screaming and shaking its feathers. Its favourite perch was on the farmyard wall, overlooking a public road, or on the top of an old chimney. For the last year of its life its habits had become much more rapacious, and there were many complaints of its marauding; but its owner was the dispensing doctor of the district, and people did not like to vex him by destroying the bird; indeed, the man who did shoot it was quite unhappy when he found that it was a tame bird.—*Donegal, in the 'Field' newspaper.*

Occurrence of the Common Buzzard (Falco buteo) near Lynn.—A fine male specimen of this bird was sent to me for preservation; it was shot at Sandringham, near Lynn, by the Hon. Spencer Cowper, in November, 1860.—*William Wilson; Museum, King's Lynn, January 16, 1861.*

Occurrence of a pied Blackbird near Lynn.—A fine male specimen of the blackbird, beautifully pied with white, was shot at West Winch, near Lynn, in December, 1860.—*Id.*

Immense Migration of Larks; Migration of Starlings.—I was staying on Lundy Island, this last Christmas, for woodcock shooting, and while there witnessed an extraordinary migration of skylarks. After the frost and snow had continued for upwards of a week, the skylarks from the mainland commenced migrating in almost a continual stream to the island, their instinct doubtless teaching them that on the island, surrounded by salt water, the frost would not be so severe. I was one afternoon on the highest point in the island, and saw these "frozen-out" skylarks arriving flock after flock. In a very short time the island was covered with them. To give some idea of their numbers I may mention that we could not fire at a snipe or woodcock as it rose

without unintentionally killing three or four larks by the same shot. Although there was plenty of food for the larks upon the island, yet we found great quantities lying about dead from starvation: these were birds which had evidently delayed their migration until so weakened by hunger that the exertion of their long flight had proved fatal to them. Directly the milder weather came we found the larks had left the island, and had returned to their usual haunts on the mainland. We had a large migration of starlings in the severe weather, but these birds were not nearly in such numbers as the larks.—*Murray A. Mathew; Raleigh, Barnstaple, February 1, 1861.*

Robin Fascinated by a Snake.—Having noticed (Zool. 7273) an account of a bird being fascinated by a snake, it brought to my recollection a similar incident which came under my own observation. When proceeding down the avenue here one morning, at a turn in the walk I saw a robin which appeared to me spell-bound, so much so as to allow a much closer approach than is usual even with that boldest of the feathered tribe. On going nearer I perceived what I took to be the cause in a large common snake, which was lying coiled up on one side of the path, with its head a little raised. My appearance broke the spell, and the robin flew away; at the same time the snake dropped its head, and assumed a perfectly inert appearance. After passing it I recollected that children were playing at the further end of the avenue, and thinking the snake might alarm them I returned to the house to get a stick with which to despatch it, and though I was only gone about a minute it had managed to disappear amongst the bushes which lined the walk, for I could see nothing of it on my return.—*John Henry Belfrage; Muswell Hill, February 12, 1861.*

Migration of Swallows.—I am informed by a resident at Malta that the last swallows were seen on the 3rd of December, two days later than they were observed in the Isle of Wight, as recorded in my note of the 3rd of that month (Zool. 7315).—*Henry Hadfield; Ventnor, Isle of Wight, January 16, 1861.*

Late Stay of Swallows and Martins in the Isle of Wight.—Has it been noticed in previous years that swallows and martins remain in the Isle of Wight much beyond the average period of their departure from our coasts, or is this year an exceptional one? I observed them at Ventnor and its immediate neighbourhood every day up to and inclusive of the 5th of this month. They appeared to be as lively and as much at home as in the middle of summer. Martins appeared to be in greatest force at Blackgang Chine on the 2nd of November: they were disporting themselves about the cliffs in large numbers. I saw but one or two swallows on that day, but in the town of Ventnor on the 3rd and 4th I saw several of the latter, and on the morning of the 5th, just before I left, the wind at the time being east and bitterly cold, I saw five. At Newport, in the centre of the island, on the same day two martins were flying about the streets: they appeared to be young ones, and were very weakly. Can it be that there is, after all, some truth in the hybernating theory, and that the nooks and crevices of the rocks and cliffs, at a point of our coast so far south as Ventnor, afford them a winter shelter? Is it not reasonable to suppose a swallow may become torpid, and sleep away the cold months, as we know the dormouse does?—*William Gostling; 5, Wykeham Villas, Wandsworth Common, November 16, 1860.*

Singular Instance of Sagacity in Birds.—At a time when there was some house-breaking in this neighbourhood I placed for protection an alarm-bell under the eaves of my house, with a rope through the wall into my own room. The cord was about the size of a common linen line, and passed over a pulley outside, going first downwards and then upwards, with the needful pulleys till it reached the bell, which hangs

a little above the hole in the wall, and on one side of it. A pair of house martins at once selected the pulley over which the rope first passes for the foundation of their nest; and although at this time the bell was almost constantly used as a signal for the hours of meals, they persevered, apparently quite fearless of the noise, or of the motion either of it or of the cord, which passed over the pulley and under or through the bottom of the nest. It was very interesting to watch these amusing birds diligently pursuing their conjugal duties and preparing for their future progeny in such a situation, and mortifying to see them, before long, expelled by a pair of common sparrows, who soon filled the nest with hay and feathers, and, usurpers as they were, proceeded to perform similar duties in their ill-gotten habitation. But perhaps the most remarkable part of the story remains to be told. After the sparrows had been some time in quiet possession, I observed about daybreak, on several succeeding mornings, a scratching and pulling at the cord, which was hanging down about six feet in my room, and without a knot at the end. This did not excite much notice, as I thought it was merely an act of playfulness on the part of the birds outside, or perhaps the action of their claws at the bottom of the nest, where the cord passed through it; but what was my surprise one day, on looking for the bell-rope, to see that it was gone, and to find it hanging down by the wall outside. These little creatures had, with amazing perseverance and industry, and, one would suppose, by a combined effort, drawn this length of the cord up through the wall, and so got rid of what was to them no doubt a source of annoyance. We restored the rope to its former place, and this time took the precaution to tie a knot at the end, to prevent the possibility of a similar occurrence. Still, determined not to be altogether defeated even by this expedient, the birds soon had the rope drawn up again as far as the knot would permit them; and, as if to tell us that it should no longer answer *our* purpose, they curiously twisted it round the iron frame in which the bell is suspended, so as totally to deprive us of the power of using it. After this we removed the nest, and again restored the rope to its proper position, since which neither sparrows nor martins have interfered with its operations. I have sometimes regretted that we did not rather sacrifice our own convenience than disturb these little laborious creatures, who had afforded so much amusement to ourselves and our friends.—*Jonathan Grubb.*

Occurrence of the Hawfinch at Banff.—In the afternoon of the 29th of December, while looking out of a window in the Hall belonging to the Literary Society here, I saw, in a pear tree in the garden at the back, a bird accompanied by a robin. On a nearer approach the stranger turned out to be a hawfinch. It appeared to be pecking at the buds, whilst robin stood by watching his movements. After remaining about half an hour it went into another garden a little farther off.—*Thomas Edward; December 8, 1860.*

Nesting of the Crossbill (Loxia curvirostra) in the County of Durham.—I procured a nest with three eggs of this species, from a woodman of the name of Grundy. He took it on the 1st of March, 1856, near Crawcrook, Durham, in a spruce fir. It was placed near the top, and about eighteen inches from the stem. The female bird was observed carrying building materials on the 24th of February, and was traced to the nest; she was accompanied by the male. Both birds were shot, and I had the satisfaction of seeing them. This is, I believe, the first time that the nest of the crossbill has been taken in this neighbourhood. Grundy, later in the same year, took another nest with eggs of this bird, not far from the same locality. This nest is in the possession of Mr. T. Robson, of Winlaton Mill.—*John Hancock, in 'Transactions of the Tyneside Naturalists' Field Club,' iv. 59.*

Occurrence of the Great Spotted Woodpecker near Banff.—A male specimen of this pretty and rather rare bird, in very fine plumage, was shot in a garden at a place called Craigston, Aberdeenshire, about seven miles from the town of Banff, on Christmas Day. On dissecting it I found the stomach literally crammed with two species of grub, of a creamy or grayish colour, and about a quarter of an inch in length, one species having a reddish and the other a blackish head; there were likewise a few small beetles and a small spider.—*Thomas Edward.*

Partridges in the Sea.—A few days ago, whilst loitering on the south sands at Scarborough, in company with two gentlemen, a geologist and an entomologist, we were suddenly surprised by a flight of what at first appeared to be wild ducks, but from their close proximity to us we were certain they were partridges. Judge of our astonishment when they deliberately made for the sea: eight of them were immediately drowned, and two alighted on a rock, to which we made our way; and our friend the geologist, being better versed in the stratification of rocks, soon observed and captured one. Thinking the tide would wash the others ashore, we waited for high water, when we obtained two more, which proved remarkably fine ones.—*Alfred Roberts; King Street, Scarborough, January 20, 1861.*

Flight of the Wood Sandpiper (Totanus glareola).—This bird was in the air when first noticed. It flies in circles, and at every change in the direction of its flight it produces a peculiar, musical, sharp and trilling sound, which endures for several seconds. At the same time the wings are observed striking the air with a short, rapid, tremulous motion, which there can be little doubt is the cause of this remarkable sound. The sound produced in a similar manner by the snipe and other waders has not the same sweet, almost warbling tone of this bird.—*John Hancock, in 'Transactions of the Tyneside Naturalists' Field Club,' iv. 58.*

Habits of the Moorhen (Gallinula chloropus).—I am often much amused in watching the habits of the moorhen, which breeds in the sedges bordering the ditch which bounds my garden. The ingenuity with which they bend down the broad sedges to form a foundation for their nest, and to conceal it, and which prompts them also to raise the nest in time of floods, so as to preserve it from injury, with the anxious and affectionate solicitude shown by them for their tender brood, render this bird an especial favourite with me. The past year has been marked by a succession of floods almost unprecedented, and it has been really wonderful how these birds, whose nest was at a much lower level than that to which the water rose, managed to raise it with the eggs gradually, so as to escape injury; yet that such was the case we had abundant evidence. One nest was so near the bank that the eggs were plainly to be seen from the garden walk, and thence we often watched the parent bird sitting upon them, or, in case of too near an approach, gliding noiselessly and stealthily down into the adjacent bulrushes, so as to be out of sight in an instant. I observe, what some others have remarked, that the bird engaged in the duty of incubation has the brilliant vermilion colour at the base of the bill. We used to consider this the male bird. Is the contrary the case? or do both sexes assume this appearance in the breeding season? I rather incline to the latter supposition. These poor birds must now be sorely pressed to find a living. Three weeks of frost and snow, with the thermometer often approaching zero, and once below it, have set fast all our waters; and yet within a few days I noticed a pair of moorhens searching amongst the grassy tufts protruding from the frozen snow for a scanty subsistence. One would suppose there must be some sort of partial migration to milder districts, perhaps to

find perennial springs which prevent them freezing.—*Jonathan Grubb ; Sudbury, January 8, 1861.*

Occurrence of the Little Bustard (Otis tetraz) in the County of Cork.—I have just examined a stuffed specimen of the little bustard which was shot by a countryman on the shore of Ballycotton Bay, in the county of Cork, on the 24th of December, 1860, during the frost, and taken in a fresh state to the Hon. John Cole, M.P., from whom I have obtained the foregoing particulars. The bird is of full-grown size, measuring 18 inches from the tip of the bill to the end of the tail, and from its plumage is probably a male of the year. Thompson, writing in 1850, gives only one well-authenticated instance of its capture in Ireland.—*Clermont ; Ravensdale Park, Flurry Bridge, Ireland, February 15, 1861.*

Occurrence of the Surf Scoter (Anas perspicillata) near Scarborough.—On Thursday, the 25th of November, I shot a fine mature specimen of that extremely rare species, the surf scoter, on the rocks at Gristhorp, near Scarborough: it was swimming in company with another duck of its own size and colour, and which doubtless was the same species. Mr. Alfred Roberts, our talented taxidermist, has preserved it for me in a very life-like manner.—*Alwin S. Bell ; 11, Crown Terrace, Scarborough.*

Duck in the Plumage of the Drake.—In March, 1858, I was taken by Oswald Simm, an intelligent observer, to the farm of Mr. Lowes, of Cramlington, to see a duck in the perfect garb of the drake. It was swimming in a small pond with some other ducks, and so completely did its plumage resemble that of the male that I should never have thought of questioning its sex. On leaving the water, however, it commenced to quack, a cry peculiar to the female, and thus rendered any announcement of the fact unnecessary: it had itself fully proclaimed its own sex. It had the curled feathers in the tail, and in every respect resembled the drake, except in having a small patch of brown on the cheek immediately below the eye. Mr. Lowes gave me the following account of this remarkable duck:—She is fifteen or sixteen years old, and for twelve years of her life she was in the plumage of her sex. Up to that time she laid regularly, and hatched several broods. In fact, the ducks I had seen in her company were her own offspring. After the change of the plumage commenced, her eggs were smaller than the usual size, and she never afterwards exhibited any inclination to sit on them. She had laid one small egg this year (1858).—*John Hancock, in 'Transactions of the Tyneside Naturalists' Field Club,' iv. 58.*

Occurrence of the Egyptian Goose (Anser ægyptiacus) in Devon.—A fine specimen of the Egyptian goose (a male) was shot at Laira, about two miles from Plymouth, and is now in the possession of a collector in the neighbourhood.—*'Field' Newspaper.*

Occurrence of the Redbreasted Merganser (Mergus serrator) at Northwick.—A female specimen of the redbreasted merganser, answering to the description of that bird given by Macgillivray in his excellent ornithological work, was shot on the Severn, at Northwick, and may be seen at W. Brooks's, Tything, Worcester.—*Id.*

Occurrence of the Hooper (Cygnus musicus) in Buckinghamshire.—On Thursday, the 17th of January, two very fine specimens (male and female) of the hooper, or wild swan, were shot at Wraggsbury, in the county of Bucks. They have since come into my possession, and I have stuffed them and added them to my collection. The following is a statement of the dimensions, which on comparison will be found equal to those of the mute or tame swan, and exceeding the general weight of the wild bird by almost 3 lbs.:—Weight of male 20 lbs.; length from tip of bill to extremity of tail 56 inches; breadth, with wings expanded, 92 inches. The female is somewhat

smaller, its weight being 19 lbs., length 57 inches, and breadth 89 inches.—*G. Hassell* (in the 'Field'); *Bexley Street, Windsor*.

Occurrence of the Hooper at Carshalton, Surrey.—During the late frost I was in my garden, and observed two wild swans flying a few yards over me, evidently with the intention of alighting on the river. They passed close to me in a similar manner three times, quite within shot; but I had not my gun ready at the right moment, though I had been watching for them. That they were the wild swan, and not tame-bred, I could easily distinguish from their yellow and black beaks.—*Samuel Gurney; Carshalton, January, 1861.*

Occurrence of the Hooper near Brighton.—On Monday, the 7th of January, I had the good luck to shoot the hooper in Poyning's Springs, where it was attracted by a couple of tame swans that were gracefully sailing about in the mill-pond there. This noble bird was in fine condition, and the plumage white as the driven snow: it made its usual hooping or whistling noise, particularly before alighting to the tame ones. It is now in the possession of Mr. Botting, of Poynings.—*T. Thorncroft; Brighton, January 21, 1861.*

Occurrence of Wild Swans at Stockbridge.—Five hooper swans have been about here for some time past, and three more have been shot by a keeper near this place. The weight of the smallest is 17 lbs. 2 oz., the next in size 19 lbs., and the largest 20 lbs. One of them is at present in my possession.—*Reginald Wigram; Houghton, Stockbridge.*

Occurrence of Bewick's Swan (Cygnus minor) at Pagham Harbour.—I have a fine specimen of Bewick's swan, one of three killed at Pagham Harbour a few days since.—*H. Pratt; 35, Duke Street, Brighton, January 15, 1861.*

Hooper and other Wildfowl killed at Southend.—At the commencement of the late frost I killed a hooper here, which measured exactly 8 feet from tip to tip of the wings, and exactly 5 feet from the tip of the bill to the extremity of the tail, and weighed 22½ lbs. His head and part of neck, wings and feet are being preserved by Mr. Ward, of Vere Street, and his body was consigned to the tender mercies of my cook, and, done ample justice to by myself and family, and a better bird I never tasted. My list of wildfowl killed here this winter includes the longtailed duck, little grebe, velvet duck, scoter, Brent goose, shieldrake, dunbird and goldeneye.—*'Field' Newspaper.*

Additional Eggs of the Great Auk.—I shall be glad if you will insert the following additions to the list given by Mr. Roberts (Zool. 7353):—England (Mr. Wilmot), 1; United States, 2; Museum, Paris, 1; private collections in France, 6; Duchy of Breslau, 1; Museum, Dresden, 1; private collections in Germany, 4; Museum, Leyden, 1; Museum, Amsterdam, 1; Museum, Russia, 1; private collection in the Netherlands, 1; Denmark, 2; Algeria, 1: making the total number amount to 44 specimens.—*Robert Champley; Scarborough, February 1, 1861.*

Additional Eggs of the Great Auk.—I have been quite amazed by the perusal of a list of the great auk's eggs, by Mr. A. Roberts, of Scarborough. It contains no reference to my great auk's egg figured by Mr. Hewitson in the third edition of his 'Eggs of British Birds,' or to the list of the possessors of such eggs given by him, which includes Mr. Scales as well as myself, who are both omitted in Mr. Roberts's list. I once possessed three great auk's eggs: I let Mr. Labrey have one, and another has devolved from my late friend Mr. Wolley to Mr. Newton. Mr. Hewitson's figure of my egg is, unfortunately, placed across the plate, so that there is not space to do it

justice; but Mr. Hewitson says it is the most beautiful egg he has seen. I believe one of the eggs enumerated by Mr. Roberts to be a manufactured specimen. The price that genuine eggs now bear should put collectors on their guard. How Mr. Roberts could write his article without referring to Mr. Hewitson's work quite surpasses my comprehension. I am also surprised that both the editor and the publisher of the 'Zoologist' (the latter also published Mr. Hewitson's work) could allow Mr. Roberts's mis-statement to pass without comment. — *J. P. Wilmot; Clarendon Lodge, Leamington, February 5, 1861.*

[I entirely exonerate Mr. Van Voorst from all participation in this matter: probably he has never seen Mr. Roberts's paper: he certainly never saw it until after publication. With regard to my own share in the transaction, I cannot conceive I have committed an error in printing the said paper: I hope it will elicit many other communications on the same subject; and I earnestly invite gentlemen who possess or know of eggs of this bird to record the fact at once in these pages: I may thus be enabled eventually to make out a tolerably complete list of these rarities.—*E. N.*]

Additional Egg of the Great Auk.—An egg of this rare, if not extinct bird, not included in those enumerated by Mr. Roberts (Zool. 7353), exists in this Museum, forming part of the extensive ornithological collection bequeathed to the town of Liverpool by the late Earl of Derby. It is covered over its whole surface with a network of fine irregular markings, interspersed here and there with coarser markings and blotches, particularly towards the larger end. At present it is in the hands of Mr. Hancock, for the purpose of being modelled, and Mr. Hancock tells me it is the most interesting specimen he has seen, and differs very much from any other egg that has passed through his hands. I have had it photographed, and shall be happy to exchange prints with any proprietor of these rare eggs, as soon as the weather will permit their being taken with effect.—*Thomas John Moore; Free Public and Derby Museum, William Brown Street, Liverpool, February 16, 1861.*

Occurrence of the Ivory Gull (Larus eburneus) at Banff.—A specimen of this denizen of the icy regions of the North was obtained at Gardenstown, about the end of December last. It is an immature bird, having the face of a blackish brown colour, and numerous black spots on the wings and upper portion of the body; the tips of all the wing-feathers, too, are blackish. There is a blackish band across the tail, very near to the end; but still it is decidedly tipped with white. With these exceptions the bird is pure white, with no appearance whatever of anything creamy or "ivory" about it, as one would be led to expect from its name. Our whale-fishers call it by the more appropriate name of "swan-bird." The specimen alluded to, which on dissection proved to be a male, is being preserved for the Banff Museum.—*Thomas Edward.*

Occurrence of the Little Gull (Larus minutus) in Sussex.—During the severe frost I have obtained two specimens of the above species; one, an adult male, shot at Eastbourne, on the 7th of December; the other, a young male, shot off Brighton, on the 7th of the present month: they are both splendid birds, the young one being much marked with black.—*H. Pratt; 35, Dukè Street, Brighton, January 15, 1861.*

Ornithological Notes from Aldeby, near Beccles.—The following birds have come under my notice during the last two months:—A little auk was killed near Burgh Starthe, December 15th. During the first part of December large numbers of pied wagtails, on Aulton Broad and vicinity. On the 20th a fine gray shrike, killed by a man in this village, was brought me. I heard of a gray phalarope being killed at

Somerleyton, but did not see it. During the present month several black swans have been seen by myself and others. On the 6th I found, in a field, a sparrowhawk which had attacked a starling: I was walking in the field, and observed a curious trail among the snow; I followed the trail down a hill for a long way, when I heard a curious shrill sound; on looking about I soon found out the cause. Close by the side of a hedge adjoining a wood were a sparrowhawk and a starling tumbling about in a curious manner; and on taking them up I found that the tip end of the hawk's wing-feathers were twisted around the toes and claws of the starling, so that, being frozen together, they could not get away from each other. They must have been so for some time, as the trail in the snow extended to a distance exceeding a hundred yards. The incident was witnessed by another person as well as myself.—*W. Winter; Aldeby, near Beccles, January 14, 1861.*

Occurrence of Rare Birds at Scarborough.—I have had the following birds brought to be preserved:—Peregrine falcon (1), roughlegged buzzard (1), gray shrike (1), masked gull (5), common gull (4), Brent goose (1), tufted duck (one pair), goosander (1), merganser (2), cormorant (2), glaucous gull (2), redshank (1), curlew (3), and many other commoner species.—*A. Roberts; King Street, Scarborough, January 7.*

Rare Water Birds occurring near Shrewsbury.—The following rare water birds have been killed at the places named, and sent to me for preservation, during the last month:—

Bewick's Swan, male (1). Very fine. Shot on the Severn, at Molverley, near Shrewsbury. I have preserved the sternum and tracheæ of this bird; the cavity containing the bend of the latter extends to nearly the whole length of the sternum.

Goosander (4). Two fine males and two females. One pair were killed near Bristol, the other pair on the Severn, near Atcham.

Brent Goose (1).

Smew (3). One, a male, in splendid plumage, shot on the Severn, at Wroxeter; the others on the Dee, near Chester.

Tufted Duck (3, all males). Shot near Bishop's Castle.

Goldeneye Duck (3). One, a male, in the finest dress. All killed near Shrewsbury, on the Severn.

Bittern (1). Killed near Churchstoke.

Little Auk (1). Picked up in an exhausted state near Shiffnal.

—*John Shaw; 6, Wyle Cop, Shrewsbury, January 31, 1861.*

Rare Birds occurring during the late Frost.—The annexed list bears the record of all the birds which have come under my notice during the late almost unprecedented weather. The species to which an asterisk is affixed have either been collected by my friend Mr. J. Hamilton, or have been purchased by him at Cambridge market. C. m. denotes obtained in Cambridge market:—

Shieldrake* (4). C. m.

Oystercatcher* (2). Captured in Lincolnshire.

Brent Goose* (14). C. m.

Goldeneye* (4, adults). C. m.

„ female (3). C. m.

Pochard* (3). C. m.

Goosander* (8). C. m.

Smew,* female (4). C. m.

„ * adult male (1). Caught at St. Holland, near Walton-on-the-Naze.

- Scaup Duck * (6). C. m.
 „ * male (3). C. m.
 Bean Goose* (3). C. m.
 Blackheaded Gull* (1). Minard, Argyleshire.
 Kittiwake Gull* (1). Shot at Coton, near Cambridge.
 Water Ouzel* (2). Minard, Argyleshire.
 Rednecked Grebe* (1). Shot in the Fern Islands.
 Blackthroated Diver* (2). Fern Islands.
 Bewick's Swan (3). C. m.
 Hooper Swan (1). Shot in the Cambridge Botanical Gardens.
 Pintail (3). C. m.
 Common Bittern (1). C. m.
 Kestrel Hawk (2). C. m.
 Shorteared Owl (2). C. m.

—S. P. Saville ; Dover House, Union Road, Cambridge, February, 1861.

Ornithological Notes from Norfolk during the late severe Weather.

By HENRY STEVENSON, Esq.

It is somewhat remarkable that the late intense cold, almost unprecedented in severity if not in duration, should have brought to our coasts so few rarities amongst those feathered visitants whom the rigours of an arctic winter have driven southwards to our scarcely more hospitable shores. The absence of such species as waxwings, crossbills, mealy redpoles and hawfinches amongst the insessorial birds, and of the longtailed and pintailed ducks from the list of wildfowl, is certainly curious in such a winter ; but it is not the first time I have observed that, from some unexplained cause, mild seasons produce those rarities which have been looked for in vain throughout a long and trying winter. For instance, in January, 1859, I recorded the recent appearance, in adult plumage, of several fine old males of the longtailed duck at Yarmouth, a very rare species on our coast, and of which no specimens had been obtained for several years ; and yet these truly arctic ducks were killed here during one of the mildest winters we have experienced for some time.

As early as the beginning of October, 1860, large lumps of teal, wigeon and other wildfowl, including even goosanders and several young velvet scoters, seemed to indicate the presence of more than usual cold in the North ; confirmed also by the appearance of siskins, lesser redpoles and bramblings, and later still of twites and snow buntings, in more than usual quantities. Fieldfares, redwings, curlews, plover, and various species of *Tringæ*, were also plentiful.

Snipe were numerous early in the season, but woodcocks scarce throughout.

All these, thus timely warned, seemed to pass on to the southward, whilst others, in more or less numbers, appeared throughout the intense frosts that followed in the months of December and January.

The fact of the broads and rivers being frozen during those months, and the fowl thus driven to the coast for subsistence, will account probably for no unusual number being obtained in this neighbourhood, either by gunners or in decoys, those killed and sent to our markets consisting of teal, wigeon and mallard, with pochards and goldeneye scaups, scoters and tufted ducks in smaller quantities. The extraordinary weather-beaten appearance of some of the fowl showed how much they had suffered from the intense severity of the weather; several old male scoters looked completely bleached, and their general appearance indicated, as surely as the sharp keel of the breast-bone, that cold and hunger had almost done their work.

Of rarer kinds, immature and female goosanders and smews have been frequently met with, but old males are very scarce, and of these the few specimens shot have been all obtained since the departure of the frost and snow.

Several hoopers have been killed at Yarmouth and other parts of the coast, and some more inland, since the breaking up of the frost; but I have heard of only one Bewick's swan having been killed in this district. Wild geese—like the wild ducks, more plentifully seen than procured—have comprised the ordinary kinds, the pinkfooted being probably the rarest amongst them.

The broads being frozen over, their usual denizens—the coots, grebes and waterhens—have had a hard time of it, the former making for the coast with other wildfowl; and snipe were not to be met with, except a few weighty specimens that had found a snug retreat beside some inland spring. Several green sandpipers were shot during the sharpest weather, between the 24th of December and the 5th of January.

The combined influences of cold, starvation and persecution caused a dreadful slaughter amongst the fieldfares, redwings, blackbirds, thrushes and starlings during the early period of the frost, especially in the Christmas week. The roads and lanes were then infested with gunners of every class, from the schoolboy to the "doubtful customer;" and I fear the amount of partridges popped off under the corn-stacks, by many of the latter description, has in some places sadly thinned the already scanty supply for another season. It is worthy of remark,

however, that in spite of a deep snow the partridges appeared to suffer less than other birds; several that I shot, during the entire batch of cold weather, were in fine condition; whilst the bramblings, larks, &c., frequenting the same stacks for food, were many of them half-starved.

During the last winter I recorded the extraordinary number of kingfishers killed near this city, of which the larger number were undoubtedly migratory visitants. This year I have seen only one or two chance specimens, brought into Norwich for preservation; but the green woodpeckers have, in their turn, suffered to such an extent that between twenty and thirty were brought to one of our birdstuffers in less than three weeks.

A great many blackheaded and common gulls were shot both inland and on the coast, and appeared to have suffered much, as did also the rooks and Royston crows.

The following is a list of the rarer species observed during the last two or three months, with dates of the capture of individuals where obtainable.

Hen Harrier. First in order, and not least in rarity, are two fine old males of this species in their delicate blue and white plumage, in which state they have become of late years extremely scarce in this county. The first of these, and the most perfect bird of the two, was shot at Hickling on the 12th of January, the other at Hargham about the same time. This bird still retained a small patch of brown on the nape of the neck, with a few brown feathers on the back. Two young males in their first year's plumage were killed at Horning and Brundall about the 21st of December.

Merlin. A splendid little male in full adult plumage (alas! very scarce now in this stage) was killed at Shottisham on the 14th of January, an immature female at Sherringham on the 24th of December, and several seen in different parts of the county about the same time.

Dipper. Two of these very accidental visitants have been shot during the winter, one at Beeston, near Cromer, on the 29th of December, and another inland on the 28th of January. These birds are no doubt stragglers from the northern counties, frozen out from their natural haunts and wandering in search of food. Both birds appeared to be immature, the white of the breast being scarcely so pure as in adult specimens, and the under parts wanting the chestnut band. I believe that the very few specimens of this bird that are met with from time to time in Norfolk are all birds of the year dispersed during the autumn and winter.

Chaffinch. A very beautiful and unusual variety of this common

bird may claim a place in this list. It was killed near Norwich on the 10th of January. The head and back are white, with the most delicate yellow tints over certain parts, and a few brown feathers are irregularly mixed with white in the wings and tail. The throat, breast and under parts also white, tinted with rose-colour.

Bitterns. Two killed at Wroxham and one at Acle about the first week in January, and one at Hempstead on the 10th. This species has, I believe, ceased to breed in our marshes, and the specimens thus met with nearly every year, but more especially in severe weather, are undoubtedly migratory arrivals from the north.

Dunlins, Knots and Sanderlings have appeared in immense numbers on the sea-coast and mud-banks of the tidal rivers. Of the former I have seen more than a hundred at one time, during the sharpest part of the frost, offered for sale in the streets, tied in bunches to a stick. A few purple sandpipers, bartailed godwits and curlews also appeared.

Hoopers. Several killed at Yarmouth and other parts of the coast during the first week in January. Mr. Somerville Gurney, whilst shooting at East Winch, on the 9th, had the rare fortune to kill no less than three, one after the other, with a breach-loader. About the 4th or 5th of February one was shot at Cossey, within three miles of this city, and three others were seen in the same neighbourhood a few days later. As before mentioned, I have heard of only one specimen of Bewick's swan, killed at Blundestone, in Suffolk. These birds were pretty numerous during the sharp winter of 1855, when two Polish swans were also shot in Norfolk.

Wild Geese. Bean and Brent geese as usual numerous, especially in the large open districts in the western parts of the county. A few bernicle and whitefronted geese have also been brought to the market, and two or three specimens of that rarer species the pinkfooted goose, but no gray-lags that I can ascertain.

Goosanders. Several females and young birds have been killed since the commencement of the sharp frosts, but very few old males, as in the winter of 1855. I have seen but two of these birds this season in their full plumage, with the rich buffy tints on the under parts, and these were killed between the 24th of January and the 5th of February, when, even in the first instance, the snow and ice had yielded to a rapid thaw.

Redbreasted Merganser. More scarce than usual. I have seen only one female and a young male, killed in January. No old males heard of at present.

Smew. Several females and young birds killed between the 8th and 15th of January in different parts of the county, some quite inland. On the 26th a splendid old male was brought to me, killed the previous day on Surlingham Broad. It was in company with another old male and a female. I have also heard of a third white smew having been shot about the same time.

Gannet. Several fine old birds shot off Yarmouth about the 12th of December.

Blackthroated Diver. A very fine bird shot on the 10th of January somewhere in the county, having the back and wings freely spotted with white, and a slight appearance of black on the throat. Another fine specimen from Hickling on the 1st of February; the back spotted, but the throat white.

Redthroated Diver. Two fine heavy birds killed at Sherringham on the 14th of January; speckled backs and white throats. A smaller specimen from Yarmouth about the 8th of February.

Cormorant. A young bird killed on the 7th of January.

Little Auk. Several of these storm-driven stragglers were picked up between the 15th and 30th of November, but none, I believe, during the frost and snow.

In comparing the above list with one which I inserted at the time in the 'Zoologist' (Zool. 4660), respecting the rare winter visitants of 1854-5, it will be seen at once that the milder season produced quite as imposing an array of rare species, whilst the number of specimens obtained in many instances far exceeded the collector's chances during the recent intense frosts. At that time more than twenty hoopoes, six Bewick's and two Polish swans were killed in this county; and out of thirteen goosanders six were adult males, with three old males of the redbreasted merganser.

H. STEVENSON.

Norwich, February 11, 1861.

Collected Observations on the Nests and Eggs of British Birds.

By EDWARD NEWMAN.

THE object of this paper is to furnish a guide to those younger readers of the 'Zoologist' who do not possess Colonel Montagu's rare and invaluable 'Dictionary,' or the expensive works of Selby, Hewitson and Yarrell. I purposed introducing the subject by some general

observations on the eggs of birds as associated in Natural Orders or Tribes, but I reserve this until my list is complete, contenting myself with stating that the number, shape, colour, position, and even the surface of birds' eggs, afford characters by which the Tribe is often indicated with great clearness. Nothing can be more artificial than the Vigorsian or quinary arrangement of birds, and it is only when this is totally disregarded that the egg, the nest, the period of incubation, can be rendered available in classification. Throughout the animal kingdom the earliest period of vitality is that which affords the most reliable and constant characters. I would not, and do not, undervalue the differences of the adult, but those who have studied the beautiful theory of representation will readily admit how completely the same colour, figure and admeasurements may be repeated in birds that have no physiological characters in common. Hence the difficulty of trusting to those characters alone.

Then with regard to the omission of so large a number of birds that appear in our lists. I am not unaware that, in the majority of such cases, the nest and eggs have been described by Temminck, Richardson or Wilson, and that the descriptions have been transferred to works treating of British Birds; but, so far as I can ascertain, in all such instances, no British nest has ever been examined and described, and therefore I cannot think there is any utility in transplanting to my list definitions that certainly have no reference to British individuals, and, possibly, not even to British species.

Lastly, with regard to the quotations from the 'Zoologist,' those which I have made were published so long ago that they have probably been forgotten. I think that when the applicable passage has been printed more than twelve years I have only referred to it; prior to that period I have sometimes quoted it entire.

Order I. RAPTORES.

GOLDEN EAGLE, *Falco Chrysaëtos*.

Situation. Cliffs facing the sea in Scotland.

Materials. Large rotten sticks, ling, grass. Generally an immense mass, with scarcely any depression in the middle. We have very slight evidence of the golden eagle now breeding in Britain; Pennant informs us that it builds on cliffs near the deer forests in Scotland and on the Snowdon range in Wales. Willoughby tells of a nest in the Peak of Derbyshire, and in the 'History of Northumberland' we learned that "it formerly bred on the highest and steepest part of Cheviot."

Eggs, 2, 3. Dingy white or gray, blotched and clouded with red-brown.

WHITETAILED EAGLE, *Falco albicilla*.

Situation. Cliffs facing the sea in Scotland and Ireland.

Materials. Sticks, ling, grass, wool.

Eggs, 2. White, unspotted. "Mr. Maxwell, of Ardraccan, in Ireland favoured us with two young birds of this species alive, taken the preceding year on a mountainous precipice or craggy cliff called Slieve Donald, impending the sea in the county of Down; the eaglets were covered with a glossy, dark, murrey-coloured down as it was termed."

—*Col. Montagu*.

OSPREY, *Falco haliæëtus*.

Situation. Tops of trees, deserted buildings, or rocks; always near water.

Materials. Sticks and wool. Sir William Jardine says "the nest is an immense fabric of rotten sticks;

‘Itself a burden for the tallest tree,’

and is generally placed, if such exists, on the top of the chimney, and, if this be wanting, on the summit of the building. * * *

Loch Lomond, Loch Awe, Kilchurn Castle and Loch Menteith have long been breeding places."

Eggs, 4. Yellow-white, spotted and blotched with red-brown.

GOSHAWK, *Falco palumbarius*.

Situation. In tall fir trees in the Orkney Islands? banks of the Dee? forest of Rothiemurchus?

Materials. Sticks, &c.

Eggs, 2—4. Bluish white.

PEREGRINE FALCON, *Falco peregrinus*.

Situation. Sea cliffs all round our coast.

Materials. Sticks, &c.

Eggs, 3, 4. Red-brown, with darker blotches and clouds.

HOBBY, *Falco subbuteo*.

Situation. High trees, often adopting the nest of a crow or magpie, and using the same materials.

Eggs, 3. Almost covered with yellow-brown or umber-brown markings and black dots.

MERLIN, *Falco Æsalon*.

Situation. On the ground among heather.

Materials. Sticks, heather, grass in small quantity.

Eggs, 3—6. Brown, marbled and thickly covered with darker spots or blotches, more especially at the larger end.

KESTREL, *Falco tinnunculus*.

Situation. Mountain rocks and sea cliffs, but sometimes takes possession of the deserted nest of a crow. Mr. Gurney records (Zool. 1820) the fact of a pair of kestrels nesting in a hollow pollard oak.

Materials. Sticks, hay, wool, slight, loose and slovenly.

Eggs, 4—6. Red-brown, or whitish with darker blotches.

SPARROWHAWK, *Falco nisus*.

Situation and Materials. Often adopts the nest of a crow or magpie in tallish trees, but certainly sometimes builds its own of sticks, &c., making a flat platform at first.

Eggs, 4—6. Bluish white, with red-brown blotches at the larger end.

KITE, *Falco milvus*.

Situation. Tall trees, placed in a strong fork. I have never known of a nest of this bird.

Materials. Sticks, lined with a quantity of soft materials, especially wool.

Eggs, 3. Gray-white, speckled and streaked with orange-brown, principally at the larger end.

BUZZARD, *Falco buteo*.

Situation. Woods, in moderately high trees.

Materials. Sticks, hay, wool, leaves; sometimes adopts an old crow's nest.

Eggs, 2, 3. Dingy white, and either plain or blotched and spotted with red-brown, chiefly at the latter end.

HONEY BUZZARD, *Falco apivorus*.

Situation. Trees in thick woods; not uncommon in the New Forest, Hampshire.

Materials. Boughs and twigs of trees broken off with the leaves on, wool, hay. The only reliable description I have read is by Mr. Willmot, in the 'Zoologist' (Zool. 437); "The nest, a very large one, was placed in the fork of a beech tree, and was built of sticks of considerable size, with which were intermixed twigs with the leaves on; the lining was composed of leaves and wool."

Eggs, 1—3. Yellowish white, spotted and stained with red-brown.

MARSH HARRIER, *Falco æruginosus*.

Situation. In those tussocks of grass or sedge so observable in marshy places, and which are elevated some two or three feet above the ground.

Materials. Sticks, dried sedge and other grasses.

Eggs, 4, 5. White, unspotted.

HEN HARRIER, *Falco cyaneus*.

Situation. On the ground at the bottom of furze bushes, on heaths and moors.

Materials. Dried heather, wool, hair, hay.

Eggs, 4, 5. Both ends equally rounded, white, faintly tinged with blue, and rarely spotted with red-brown.

ASHCOLOURED HARRIER, *Falco cineraceus*.

Situation. On the ground amongst furze and low brushwood.

Materials. Heather, sticks, hay, wool, laid loosely together.

Eggs, 4—6. White. This hawk has a great propensity to take and devour the eggs of other birds, as recorded by Mr. Rodd at p. 3475 of the 'Zoologist.'

LONGEARED OWL, *Strix otus*.

Situation. Trees in woods.

Materials. Adopts the nest of a crow or magpie, never making one of its own.

Eggs, 3—7. White, almost equally blunt at both ends.

SHORTEARED OWL, *Strix brachyotus*.

Situation. On the ground on extensive moors and heaths.

Materials. Scarcely any. Sir William Jardine writes of the earth being merely scraped or scooped out in the form of a nest.

Eggs, 4, 5. White, equally blunt at both ends.

BARN OWL, *Strix flammea*.

Situation. Barns, churches, ruins, old buildings and hollow trees.

Materials. Generally very slight; sticks, hay, and often only the bird's castings.

Eggs. Laid in pairs; a second pair, and often a third, being laid before the young produced from the first pair has flown.

TAWNY OWL, *Strix aluco*.

Situation. Trees, generally adopting the old nest of a crow, sometimes, according to Selby, in hollow trees.

Materials. None brought by the birds.

Eggs, 3—5. White, elliptical.

Order II. INSESSORES.

REDBACKED SHRIKE, *Lanius Collurio*.

Situation. In whitethorn hedges, furze bushes, &c.

Materials. Moss, wool, hair, bents of grass.

Eggs, 5, 6. Pink-white or cream-colour, with brown spots, particularly at the larger end.

SPOTTED FLYCATCHER, *Muscicapa grisola*.

Situation. In trees trained against houses and other buildings, particularly pears, apricots, roses; often in barns, summer-houses and green-houses; once in a lamp at Leeds, and once in London. See also p. 3657 of the 'Zoologist,' and especially p. 3577, where it is related that the nest was built on a hoe that hung on a nail in a tool-shed, and was not discovered until finished. When the hoe was wanted the nest was taken off and laid on a shelf, and returned to its original site as soon as the hoe was hung up again, an arrangement which the parent birds cordially approved, and eventually brought off their young ones in safety.

Materials. "Of three nests now before me, one is formed on the outside of old dark-coloured moss, mixed with roots, the lining of grass stems, with only two or three white feathers; the second has the bottom and outside of fresh green moss, lined with a few grass bents, long horse hairs, and several mottled hairs, apparently those of a turkey; the third is similar to the last on the outside, but lined with long horsehair, wool and feathers."—*Mr. Yarrell*.

Eggs, 4, 5. Gray-white, with pale raw-sienna spots.

PIED FLYCATCHER, *Muscicapa atricapilla*.

Situation. In hollow trees.

Materials. Leaves, hay, hair, feathers.

Eggs, 4, 5. Pale blue-green, unspotted.

DIPPER, *Cinclus aquaticus*.

Situation. Banks of streams, caves, underneath the arches of bridges.

Materials. Moss for the exterior, dry leaves for the lining, of large size and almost globular form, with a central hole for the entrance and exit of the bird.

Eggs, 5. White, delicate, semitransparent, unspotted.

MISSEL THRUSH, *Turdus viscivorus*.

Situation. In trees, resting on a branch close to the trunk, often amongst ivy. A singular instance of a pair of this bird laying twice in the same nest is recorded by Mr. Bond. "A pair of missel thrushes built a nest in a low shrub in a neighbour's garden, and brought off their young; since which the hen laid four more eggs, but after sitting some time deserted the nest in consequence of its cracking nearly in two."—*Zool.* 656.

Materials. Moss, grass, wool, the interior lined with slender dried stems of grasses.

Eggs, 4—6. Pale green, speckled with brown of two shades.

SONG THRUSH, *Turdus musicus*.

Situation. Hedge-banks, sometimes on the ground and low bushes, or against the trunk of a tree, especially in ivy.

Materials. Moss and grass outside, the interior lined with a coating of moss, clay or cow-dung, in which decayed wood is often mingled.

Eggs, 4—6. Blue-green, with purple-black spots; sometimes unspotted. A very unusual departure from the usual colouring is recorded in the 'Zoologist' (Zool. 1875), the ground being white, the spots dark red.

BLACKBIRD, *Turdus merula*.

Situation. Bushes, holly, laurel, in ivy on a tree trunk, &c. Mr. Duncan mentions in the 'Zoologist' (Zool. 382), an instance of a blackbird building its nest within that of a magpie. I have repeatedly known a pair of blackbirds commence four or five nests near the same spot, and only finish one of them: the cause of this I am unable to explain.

Materials. Moss, twigs, roots, intermixed with mud, clay, or cow-dung, but lined inside this plastering with very fine slender grasses.

Eggs, 4, 5. Blue-green, rather dull, uniformly sprinkled with brown; rarely bright blue-green, unspotted.

RING OUZEL, *Turdus torquatus*.

Situations. Only in the northern mountainous districts of England and Scotland, on steep banks, in clefts of rocks, low bushes, &c.

Materials. Moss, roots, lined with fine grasses.

Eggs, 4, 5. Blue green, dull, freckled with brown. Either blackbirds' eggs are offered for sale as those of the ring ouzel, or the eggs of the two species are so similar as scarcely to be distinguished.

HEDGESPARROW, *Sylvia modularis*.

Situation. In whitethorn hedges, dwarf hollies, laurels, furze bushes, &c.

Materials. Moss and wool lined with hair.

Eggs 4—6. Bright blue-green.

ROBIN REDBREAST, *Sylvia rubecula*.

Situation. Quite on the ground on banks, but generally protected by roots, or in a cavity, or under ivy. Many other and very strange situations are recorded. The Rev. John Atkinson mentions (Zool. 565) an instance of a pair of robins building in a watering pot.

Materials. Moss, dried stems of herbaceous plants and leaves, lined with hair.

Eggs, 5, 6. Gray, with red-brown spots, but frequently white and unspotted.

EDWARD NEWMAN.

(To be continued).

Fish Devoured by Snails: Longevity of the Stickleback.—The freshwater aquarium is now so common an object of attention that probably few of the many interesting facts to be observed in the habits of its inmates remain unrecorded. I was not, however, fully aware until rather lately that the larger water snails (*Limneus pereger* at least) catch and devour the small fish when they are placed with them in confinement, but whether this is the case in their native pools and streams I am not able to say. I was for some time at a loss to discover what could occasion the death of several minnows which I found mutilated and partly eaten, when at length I perceived one apparently just caught, with its tail in the grasp of a large *Limneus*. This, I think, happened repeatedly, and served to acquit of the destruction a fine silver fish, which I had been ready to accuse in this matter. I never witnessed the actual capture, and am still puzzled to imagine how such agile little creatures, darting rapidly here and there amongst the aquatic foliage, can fall a prey to the slow-paced mollusks which cling to the glass or the rock, or glide with scarcely perceptible motion, shell downwards, on the surface of the water. That elegant and curious insect called (I believe, but am not learned in these matters) the “water-boatman” (*Notonecta*), soon had to be dismissed, much as I enjoyed watching his evolutions; he clearly made too great havoc among his finny companions; but there was no mystery in this, considering the swiftness of his movements. The *Paludina vivipara*, though here of a very large size, seems perfectly harmless, and, as far as can be seen, eats neither animal nor plant in a living state, subsisting on the decaying vegetation, or perhaps on the Infusoria and other creatures invisible to the naked eye. Of these latter, the little “world of water” in the aquarium seems to contain an endless and most beautiful variety, affording a vast supply of wonders for the microscope; indeed a common pocket lens will often reveal a fringe of animated flowers, or wine-glass-shaped animals, adhering to the leaves of the *Chara* and other water plants. The *Paludina*, *Bythinia*, &c., bury themselves for weeks or months in the soil at the bottom, and crawl up at intervals, their shells sometimes clothed with a branching moss-like vegetation. The larger specimens of *Limneus pereger* seemed all to die last summer, as soon as the eggs were laid, but the smaller ones have continued alive and still growing for a long time. When they die the animal often remains attached to a plant or other substance while the shell becomes loosened and drops off, perfectly empty to the tip of the spire. This accounts for what had often excited my surprise when collecting for a cabinet, *viz.*, the large number of fresh and clean specimens to be found amongst the drift from the river in time of flood, showing that the mollusk had not decayed away in its covering as one might expect. The eggs are worth examining in the microscope, the movements of the little snails being very discernible through the transparent membrane enclosing them. Yarrell says the stickleback lives only about two years; one of mine has been in the aquarium, I think, nearly double that time, and continues an exceedingly tame and amusing pet, always coming to my fingers to be fed or noticed when anything requires attention in its neighbourhood.—*K.*; *Sudbury, January 10, 1861.*

Occurrence of the Dory (Zeus Faber) near Hartlepool.—On the 13th of February, 1860, a fisherman from Hartlepool brought me a fish which he did not know; it proved to be a small but good specimen of the Dory. It was 13 inches long, and about 6 inches broad. This is the first occurrence of this fish on our coast with which I am acquainted.—*John Hogg, in 'Transactions of the Tyneside Naturalists' Field Club,'* iv. 336.

Eel caught in a Field.—My man has just brought me in a large eel which he caught in the middle of a stubble field. There is an old pit in the stubble field with a little water in it. The length of the fish is $39\frac{1}{2}$ inches, girth $8\frac{1}{2}$ inches; weight 4 lbs. 12 oz. I never knew an eel caught in this way before: perhaps you will know if it is usual for eels to leave the water at this time of the year. The colour of the fish is very good.—*George Hoult (in the 'Field');*; *Crown Brewery; Whittle Springe, near Chorley, Lancashire, December 13, 1863.*

Snails as Food for Sheep.—Several writers in the 'Field' newspaper have lately mentioned the circumstance of the sheep in Devonshire eating snails, and one writer believes this novel food gives its admitted superiority to Devonshire mutton. Is the species thus eaten by the sheep that mentioned in the following communication?—*Edward Newman.*

Notes on Helix revelata.—On the 11th of December a friend from an inland town called upon me for the purpose of being made acquainted with *Asplenium marium*. As I greatly wished that my friend should see this fern in its native luxuriance, he was conducted to the semi-marine rocks and caves of Whitsand Bay, on the south coast. In a large plateaued ravine that led from the top of the cliffs to the beach, patches consisting of hundreds of plants of *Erodium maritimum* were to be seen, and on them and the surrounding herbage appeared large numbers of node-like forms, which a closer scrutiny revealed as *Helix revelata*. A new feature observed on this occasion is that this shell was exposed on the uppermost parts of the herbage. At all other times when requiring this mollusk I have had to seek it in its haunts, which are generally under objects that offer sufficient shelter to the animal. In June, whilst collecting plants for the herbarium, *H. revelata* was near the roots or under the foliage of *Erodium cicutarium*, *Trigonella ornithopodioides*, *Trifolium subterraneum*, *T. scabrum* and *Ornithopus perpusillus*, and also about many other plants of recumbent growth. The state of the atmosphere in June was damp, in December it was wet, and had been for several days in like condition. *H. revelata* is a plentiful species in the above-named locality. In parched seasons *H. revelata* is concealed under cover of the many objects that are found in Nature suitable for the purpose. Thus in dry weather it is deeply hidden between the line of demarcation, where the herbage ceases to grow at the base of rocks and stones. It is likewise to be found snugly burrowed some inches under the surface of the ground, about the outline of clumps of furze. Other facts observed on the 11th of December, and worth recording, are: *first*, there were many full-grown dead shells lying on the turf; *secondly*, these shells were mostly in as good condition as the living shells, for the colour, the epidermis, together with the hairs thereon, were well preserved. Whitsand Cliffs consist of dry sloping rocks of slate, having no pools and very few streamlets. In summer time, when there is summer weather, the greater part of the cliffs and slopes are as a desert deserted, the turf is so scorched. As the head habitat in Britain for *H. revelata* is on the above-

named cliffs, this species cannot rightly be considered a moisture-loving mollusk. It rather appears that this animal prefers a station where an intermediate condition of not too wet and not too dry is the order of things. *H. hispidus* occurs in wet places in the neighbourhood, but no *H. revelata* in its company. From the preceding notes may be gleaned of *H. revelata*, *first*, it is a plentiful species at Whitsand Cliffs; *secondly*, this shell is full grown late in autumn, as dead shells in good condition, in great numbers, were found in early winter; *thirdly*, superabundant moisture, as well as an arid state, are not congenial to its development, as the species shuns both conditions.—*J. J. Reading; Plymouth, January 15, 1861.*

The new British Physa.—It is with pleasure I see this mollusk, which has been a subject of controversy with me for several years, has stood the test of a thorough examination and proved to be distinct, and feel that I must add my testimony to its claim to rank as a true Briton. It was about four years since, when collecting fresh-water Mollusca, that I first found this species, and was struck with its apparent difference from anything I had, but, being quite a novice in Conchology, was unable to point out its minute distinctions. I therefore brought it to the notice of several conchologists of my acquaintance, and they declared it to be *Physa fontinalis*; with this decision I was, however, not satisfied, and kept the specimens apart, carefully labelling the locality. Upon coming to Kew last spring, I immediately recognised my old acquaintance—namely, the *Physa*—in the tanks used for aquatic plants in the Botanic Gardens, and pointed it out to Mr. Choules, and he, upon referring to his journal, found that many years since he had collected plants for these tanks in the locality I mentioned to him, and without a doubt the *Physa* must have been brought with them, where it had remained unknown and uncared for till last summer. The notice sent by Mr. Choules (Zool. 7278) has led to its identity by gentlemen whose authority we cannot doubt. In answer to Mr. Dalton's query, I can state that confinement in the tanks does not by any means tend to develop the spire to an unnatural extent; the specimens sent to Mr. Norman were the average size to which it attains in its native habitat, but one specimen I have in particular is a much larger shell than any I have seen in the tanks. It is by no means common in its natural locality, the few specimens I have and those sent for examination being, I think, all that are at present known; but I cannot conceive it at all probable that it has been introduced to the little spot where, four years ago, I first found this new addition to the British Mollusca.—*William Hugh Gower; 3, Park Cottages, Kew.*

Paludina vivipara not invariably viviparous.—That the specific name of this mollusk is not (invariably at least) descriptive a sufficient proof has just occurred in a fresh-water aquarium, inhabited by several individuals for many months past. A remarkably fine specimen has deposited some large semi-transparent eggs, from which, I have every reason to believe, the young emerged in a day or so afterwards: they were visible within their covering, and afterwards in the neighbourhood of the deserted membrane. The little creatures (it may not be new to observe) are, at this early age, clothed all over the shell with pellucid hairs, and a row of spines remains, until they are about half-grown, surrounding the middle of each volution, but at length they appear to become quite smooth. Those lately excluded are, at the present time, very elegant objects, the shell delicately ornamented with the spiral brown lines, which, in the parents, become partially obscured by some vegetation accumulating upon them, the more, perhaps, from their extremely sluggish habits in keeping long quite motionless at the bottom of the water. Possibly in the summer, and in the

river, there may be no eggs laid, although the fact is as I have stated in the winter, and in a tank which was lately frozen over.—K.; Sudbury, February 11, 1861.

Note on Lampania zonalis.—This genus belongs to the estuary group of Cerithiidae, with orbicular multispiral opercula. It inhabits sand and mud flats between tide-marks. The animal, in nearly all particulars, resembles Cerithium: there is no visible siphon, only a pallial fold; the whitish tentacles are ringed with dark brown; the muzzle is broad, annulated with dark brown, and fringed at the under edge with short whitish beards; the back of the neck is marked with square brown spots like the dark spots on the shell; the foot is short, truncate in front and lineated with dark brown. *Lampania* is inactive and crawls slowly; it is very tenacious of life, surviving removal from the water several days. It is a very ubiquitous mollusk: I have met with it at Macao and Hong-Kong in the South and at Ta-lien-Hivan and Shantung in the North of China. In the Sea of Japan I have followed it from the Korean Peninsula in the South to the island of Saghaleen in the North.—Arthur Adams.

Capture of Lepidurus glacialis in Lian-tung.—On the 12th of September we land on a projecting point, marked on the charts as an island, on the eastern side of the gulf of Lian-tung, about forty miles north of Hulu-Shan Bay. On leaving the boat near the rocky cape named Cape Vansittart, which is separated from the mainland by a flat sandy neck, we approach a rounded knoll, on the summit of which is a square watch-tower with Tartar horsemen grouped picturesquely around, a scene my artist friend, Bedwell, is desirous of sketching. In the distance are the angular cold gray peaks and ridges of a barren mountain-range, with here and there a gleaming streak, as of quicksilver, running down their sides as the sun shines on the water-courses and little winding streams. At the base of these lifeless granite masses stretches a level plain, green and fertile, where little straggling hamlets of low flat-topped mud-houses are snugly sheltered in long groves of trees. To this succeeds a sterile sandy belt with a chain of freshwater ponds, shallow and full of weeds, and with muddy open spaces between them,—the natural resort of the curlew, the whimbrel, the plover and the snipe. Here also we see the spotted crane (*Gallinula porzana*, Linn.), a very sly little fellow, keeping close in the cover of the reeds and grass. The pretty but scentless Chinese pink, a little blue-flowered Iris, and a yellow, red and white mixture of the blossoms of the tormentil, the heads of *Sanguisorba* and the loose corymbs of the flower-of-yarrow, complete nearly all the plants that redeem the sandy soil from sameness and utter sterility. Nearer the sea long salt-water lagoons and shallow swamps extend, covered in some parts with a white-flowered sea-lavender and the blue stars of *Aster tripolium*, and from which the great white heron (*Ardea alba*) slowly rises, with bright yellow bill stretched out in front and long black legs stretched out behind, and after a few lazy flaps with his huge curved wings, alights again to resume his interrupted fishing. Equally familiar is his yet larger cousin in gray, the common heron (*Ardea cinerea*), and, standing on one leg, her loose snowy plumes waving in the breeze, the elegant white egret dreams of frogs and fishes. Sandpipers and green-shanks run piping and probing about the margin, and gulls and little terns (*Sterna minuta*) scream, quarrel and hover over the heads both of bipeds and birds. Now as I stoop to collect some specimens of *Limnæa*, in one of the clear freshwater ponds with a bottom of sandy mud, my attention is arrested by an object which, at first sight, I

regard as an unknown genus of bivalve Mollusca, but on placing it in a bottle of water the real nature of the creature becomes revealed ; it is an Entomostrakon : as a whale among minnows, so, said I, is my new genus among water-fleas ; but again I was mistaken. I had not fished long before I brought to light a veritable Apus or shield-shrimp, and I saw at once that my supposed new genus was the young of it, thus illustrating very prettily the law in the development of organized beings, that the transition state of a higher form will represent the permanent condition of genera lower in the same class, for the Apodidæ are justly regarded as the highest among Entomostraca. When I get on board I examine my captures with the valuable aid of my friend Dr. Baird, or rather of his ' Monograph of Apodidæ,' and I find they belong to Leach's genus *Lepidurus*, which is furnished with a plate between the bases of the long caudal filaments. I find, moreover, that my specimens agree exactly with the description of *L. glacialis* of Kroyer, from Cape Krusenstern in North America : " The tail setæ are finely plumose, and the flap between them is of a somewhat square shape, short and toothed on its edges." I cannot find any account of the metamorphosis of the Apodidæ, or whether it is known that in the young state the shield is folded on itself longitudinally in the form of a bivalve shell, which entirely conceals the head, body and feet of the animal. There is but a single large black eye in these young ones, situated Polyphemus-like, in the middle of the forehead. The very young larvæ are of a pale horn-colour, and swim in a steady manner forwards, the ventral edge of the shell being directed downwards. As they move through the water they partially expand and close the valves of the shell. Older and larger individuals are olivaceous, and are fond of lying on their sides in the sand at the edge of the pond, and now and then spin round and round by means of their protruded tail. The adult of Kroyer's shield-shrimp, as it may be called, keeps in deep water, and is voracious and predatory, not confining his attention to small things in the water, but even feeding on drowned dragon-flies.—*Arthur Adams.*

Eggs of the Genus Colias imported in Clover (see Zool. 7359).—I have for many years thought that the eggs of *C. Edusa* — the only species I have seen here — are imported along with clover seed from the Continent, and which is sown every year all over the Cotswolds. I can only account in this way for the appearance of this butterfly on our hills. My observations are chiefly confined to the neighbourhood of Cirencester, where I have seen this insect occasionally, either by the road-sides or in the garden, but not more than two or three in the season, until the year 1859, when they appeared in great numbers. I remember, in a walk of four miles along one of the roads which leads from Cirencester into the country, counting more than twenty, and they were seen in other directions. The sides of our highways on the hills have mostly been quarried, and in these spots a profusion of small flowers spring up, which no doubt attract these butterflies from the fields where we may suppose they have been bred. It is a beautiful and refreshing sight to see them pass and repass, and alighting on the various flowers, quite undisturbed in their peaceful and happy enjoyments. I think that all of those which I saw were males. I did hope, that having appeared in such numbers and in so inviting a region, I should have seen some the following year ; but no, not one was on the wing. This may be accounted for by the extreme wetness of the season ; and I understand on the south coast of Devon, where

they were in profusion in 1859, none were seen in 1860: this I know from my own observation in our locality. The practice of paring and burning the surface soil every third year would in a great measure prevent the permanent settlement of the species on our hills. The statement of Mr. Gregson seems to want further elucidation, to satisfy the minds of those who cannot understand how the eggs of a butterfly can be introduced into a seed protected by so hard an envelope. If the butterfly lays her eggs upon a leaf or some portion of the stalk of the plant, I think then there would be no difficulty in the case. The lucerne is not cultivated on the Cotswolds, and I know well what an attraction its flowers offer to numerous species of butterflies, having seen even small patches of it alive with them.—*Joshua Brown ; Cirencester.*

[The interesting ingredient of the importation hypothesis will be found in the fact that the observations of a hundred years go to show that the egg is always laid on the leaf, and is always hatched within ten days of being laid, as I have stated in the 'Butterfly Number,' p. 6, line 48. How during these ten days can it get into a sack of clover seed?—*Edward Newman*].

Eggs of the Genus Colias imported in Clover (see Zool. 7359). — I said in a paper read before the Northern Entomological Society, on the subject of disputed or imported species, that by carefully passing the bottoms, that is the last few pounds, of sacks of seed, under my glass, I had succeeded in finding more than one species of Lepidopterous eggs amongst the seed; but as that paper was lost at the Meeting, and only found again by accident, and returned to me by the friend who found it amongst his papers, and has never been read by any one except the said friend, or left my hand since, I am at a loss to think how Mr. Newman could construe a sentence incidentally used in the 'Intelligencer' into such a fact as he tells us I have discovered. In my paper I said I supposed that in dressing the seeds the eggs were loosened, sieved with the seed, and so reached England. I showed that it was quite impossible for certain species to reproduce themselves in certain localities without being seen annually by the sharp eyes that were on the look-out for them, instancing certain species in special localities, &c. A discussion ensued, ending in its being shown that the eggs, like the seeds, could not be injured by the weight of the seed upon them, &c.; and I believe the paper gave general satisfaction, and was said to have "opened quite a new point of view to look at disputed species from." I cannot help saying that, having quite satisfied myself on this question, I thought so little of the paper itself that I did not even know it was lost until I received it through the post, accompanied by a letter saying that my friend had read it and was well pleased with it.—*C. S. Gregson ; Stunley, near Liverpool, February 12, 1861.*

[I have taken the liberty of striking out three paragraphs which bore rather severely on London entomologists generally, and on myself in particular; the first, because I stand alone in having introduced this matter to my readers, no one else having taken any part therein; secondly, because to any charges against myself I ought in courtesy to reply; and I believe I have not a single reader who would care a straw either for the attack or defence. Mr. Gregson's words, as originally printed, are these:—"I am quite ready to admit that the clouded yellows and other foreign eggs, which are imported in clover and especially in lucerne seeds, might not hatch for want of a high temperature, and so we should not have them amongst us."—'Intelligencer,' vol. ix. p. 56, the first line. I know nothing of Mr. Gregson's paper which was lost and is found again; in fact I now read of such a paper for the first time; but I would ask Mr. Gregson, as a favour to my readers and myself, to state explicitly,

and unaccompanied by any personal remarks (which seem to me quite as foreign to the subject as he considers the clouded yellows to our island), whether he has found the eggs of the genus *Colias* among the seeds of lucerne or clover, and whether he has reared the perfect butterfly therefrom? The great novelty of Mr. Gregson's discovery is the persistency of the egg state: in few butterflies yet observed has the egg state been found to last more than ten or twelve days: by what process, either agricultural or scientific, was the vitality of the egg thus prolonged?—*Edward Newman.*]

Occurrence of Deilephila Galii at Worthing.—Seven specimens of this insect were taken here last autumn: four were bred from larvæ taken on *Galium verum* (bed-straw), near Shoreham.—*W. Rickman*; 2, *Chapel Road, Worthing, January 12, 1861.*

Observations on the Families Agaristidæ and Melameridæ.—Mr. Newman's remark (*Zool.* 7227), that "it is unnatural to divorce *Eusemia* from *Callimorpha* and *Chelonia*," is a truth self-evident at first sight, but which admits of some modification on a closer inspection. It has been acknowledged by Herrich-Schæffer, and also to some extent, unwittingly, by Mr. Walker in the British Museum 'Catalogue,' several insects there placed in the midst of the *Chelonidæ* belonging truly, I believe, to the *Agaristidæ*. Like many other groups, I believe the *Agaristidæ* will be found to be by no means constant in the form of the antennæ, which has hitherto been considered one of their principal characters; and we shall find some of them possessing the *Chelonian* and some the *Noctuidan* type of antennæ. Their wing-venation approaches closely to that of the *Noctuæ-Trifidæ*, and differs in some obvious points from that of the *Chelonidæ*, to which, however, it is also not very distantly related. In the structure of the head and antennæ *Agarista*, *Alypia*, *Eusemia*, &c., remind us of the *Rhopalocera*, with which, however, they have little else in common; and in their legs and bodies, as well as the structure of their wings, they are much more nearly allied to the *Noctuæ*, to which some of the genera, *Eudryas* for example, form a complete transition. We thus see how impossible it is to class these singular insects satisfactorily, uniting as they do the characters of groups not usually placed in juxtaposition: I believe, however, that the most natural situation in which they can be placed is in close proximity to the *Chelonidæ*, which they will connect, in a circular arrangement, with the *Noctuæ-Trifidæ*, and also with the *Rhopalocera*.* In the British Museum table-cases, two years ago, were, and probably still are, to be found certain Australian insects of the genus *Apina*, *Walk.*, classed with the *Agaristidæ*, while in the general collection down stairs these insects stand in the midst of the *Chelonidæ*: which is right will no doubt be determined when the transformations are known; but as *Apina* possesses the wing-venation, and sundry other characteristics of the *Agaristidæ*, I certainly incline to place it with them rather than with the *Chelonidæ*. In regard to some other insects, such as the curious little North-American *Psychomorpha Epimenis*, placed in the British Museum Collection among the *Nyctemeridæ*, we can take surer ground, since not only does it agree in the venation with the *Agaristidæ*, but the transformations and habits, as given by Abbot in the beautiful collection of drawings of North-American insects in the library of the British Museum, fully confirm the inference deduced from the structure of the perfect insect. The larva closely resembles that of *Alypia octomaculata*, which no one can doubt belongs truly to the *Agaristidæ*. Let any one now compare the transformations of *Eudryas Unio* (Abbot's drawings,

* The *Hypsidæ* connect, in a similar manner, the *Chelonidæ* with the *Noctuæ-Quadrifidæ*.

tab. 221) with those of the two insects just mentioned, and he can scarcely fail to come to the conclusion that it also belongs to the same family, although it has recently been placed with the Glottulidæ, to which it certainly has considerable affinity. Several other insects among the Chelonidæ in the British Museum—such as *Anaphela luctifera*; possibly the genus *Ovios*; and *Phægorista*, *Massaga* and *Rhosus* among the *Pericopidæ*—will probably eventually be classed with the *Agaristidæ*. Two new species described by Mr. Walker in the genus *Melanchroia* appear likewise to belong to this family, and also *Josia Noctilux*, *J. continua* and *J. separata*, which, though they have somewhat similar colouring, entirely depart from the typical structure of the *Melameridæ*. In the family just mentioned, as arranged at the British Museum, *Dioptis hesperoides* would also appear to belong to the *Agaristidæ*; and the entire genus *Dioptis* seems to want revision, having apparently little in common but the style of colouring. The group *Agyrta*, including *Micilia*, *Dux*, &c., have two pairs of well-developed spurs to the hind tibiæ, with the venation of *Ctenucha* and the latter genera of the *Euchromidæ*, with which they should probably be associated. *D. vinosa*, *D. Ergolis*, &c., have one pair of minute spurs to the hind tibiæ, with venation approaching the *Pericopidæ*, and should probably be placed in that family; while *D. glaucopsis*, *D. sobria* and *D. umbrifera* possess the structure of *Josia monilis*, &c., and belong unquestionably to that genus. It is much to be desired that some entomologist visiting South America would seek to verify Stoll's figures of the transformations of *Dioptis Micilia* and *D. cælestina*. It seems scarcely possible to suppose that some error has not taken place with regard to these insects and the two species of *Melanchroia* which he figures on the same plate, both the larvæ and cocoons resemble so closely those of the *Limacodidæ*, and the two pupæ seem much too robust for such delicate insects as *D. Micilia* and *D. cælestina*.—*R. F. Logan; Duddingston, Edinburgh, December, 1860.*

Occurrence of Lithosia caniola of Hübner in Devonshire and in Ireland.—Mr. King, of Torquay, called upon me a few weeks since with some insects collected in Devonshire and Cornwall, from which I picked out a worn specimen of a *Lithosia* which appeared distinct from any recorded British species: I believe it to be *L. caniola* of Hübner, &c.,—a species not uncommon in France, and very likely to occur here. Mr. Barrett took four specimens of the same species in Ireland last August, one of which he kindly sent me to examine. Although in much better condition than the one which I have, it is not fine; but I think there can be little doubt of its being *L. caniola*, a species likely to be overlooked from its dull colour, which would lead many to consider it one of the common species in faded condition. My friend M. Guenée, who has had all my *Lithosia* for examination, has just sent a paper upon the European species of the genus *Lithosia* for publication in the 'Transactions' of the Entomological Society of France: as soon as it appears I will send a few remarks upon the British species for insertion in the 'Zoologist.'—*Henry Doubleday; Epping, February 11, 1861.*

Description of the Larva of Hemerophila abruptaria.—Ground-colour pale grayish or greenish drab. Segmental divisions pink. Down the centre of the back a series of purplish blotches, becoming confluent on the anterior and posterior segments, on the latter almost evanescent. Back, belly and anal plate sparingly spotted with black. Immediately preceding the latter a black belt encircling the whole body. In the centre of each ventral segment some spiracle-like spots. Belly greenish. Spiracular lines dusky. The body tapering gradually towards the head. Capital segments

flattened; anal segments raised. Feeds on privet and lilac. The larvæ from which the foregoing description was taken were hatched in May and full fed in July. Pupa dusky red, in a tough semi-transparent silken web. — *H. Harpur Crewe*; *Drayton-Beauchamp Rectory, Tring, February 6, 1861.*

Oviposition of Eupithecia sobrinata.— In July, 1860, I found a pair of bred *Eupithecia sobrinata* in cop. The female in the course of a few days deposited a few yellow eggs on a sprig of juniper: these shortly turned dull leaden blue. On the 26th and 27th of January, 1861, the young larvæ hatched, and began immediately to feed on juniper. As the eggs were kept in a cold room without a fire, I have no doubt that this is the normal time of hatching.—*Id.*

Description of the Larva of Ptilophora plumigera.— Pale whitish green. Centre of back bluish. Subdorsal lines distinct, white. Spiracular lines pale yellow, slender and waved, two on each side, the lower of each pair becoming broader on the anterior and posterior segments. Segmental divisions pale yellow. Belly grass-green. Feeds on maple in shady woods and hedges, generally in chalky districts. Full fed at the end of June and beginning of July. Eggs brown, laid in November. Pupa in a tight earthen cocoon; rather short and thick; rich dark reddish brown. Thorax and wing-cases almost black. Abdominal tip furnished with a bristly bifurcate appendage.—*Id.*

Description of the Larva of Leucania lithargyria.— Ground-colour ochreous or reddish drab. Central dorsal line slender, blackish with a white centre. Subdorsal lines broad, deep black, bordered with white on the lower side. Between the dorsal and subdorsal lines a very slender indistinct dusky line. Spiracles black, in a whitish ring. Between the latter and the subdorsal lines a whitish waved line edged with black. Between the spiracles and legs two conspicuous yellow lines. Belly destitute of spots or markings. The subdorsal lines vary much in intensity of colour. Feeds in April and May, on various species of grass, at night; concealing itself by day, and crawling up the blades as soon as it is dark. Full fed from the middle to end of May. Pupa bright red, in an earthen cocoon.—*Id.*; *January 18, 1861.*

Description of the Larva of Xylophasia hepatica.— Back dark brown. Central dorsal line whitish, bordered on either side, on each segment, by two black spots. Subdorsal lines slender, indistinct, whitish. Head and post-capital segment dark brown, the former mottled with a paler colour and traversed by two black lines. Sides pinkish drab, marked on each segment with a black spot. Belly pale drab. Back and sides thinly clothed with slender hairs. Hibernates nearly full fed. Begins to feed again on grass, chickweed, &c., in February. Full fed towards the end of March or beginning of April. Pupa dark red, blackish on the thorax and upper part of abdomen; enclosed in a neat cocoon of earth or moss.—*Id.*

Capture of Stenolophus derelictus on Wimbledon Common.— We had the good fortune to capture a single specimen of the above insect in a gravelly spot on Wimbledon Common, on the 19th of March, 1860. We did not recognize it till pointed out to us by our friend Mr. H. S. Gorham; and on subsequently showing it to Dr. Power he immediately identified it as *Stenolophus derelictus*. As another gentleman as well as Dr. Power and ourselves possess specimens, irrespective of the type possessed by the Rev. J. F. Dawson, and as there seems to be some doubt as to their being identical with that type, we think it very advisable that the whole of them should be submitted to some competent authority to have it finally settled.—*A. and M. Solomon*; 16, *Graham Villas, Pownall Road, Dalston, February 12, 1861.*

Capture of Staphylinus stercorarius amongst Ants.—I have this year (1860) taken *Staphylinus stercorarius* in the nests of *Myrmica lœvinodis*. This *Myrmica* is exceedingly abundant near the large ballast heap at South Shields, and forms its nest beneath stones. In these nests, or in their immediate vicinity, the *Staphylinus* is to be found in August and September. The presence of Coleopterous insects in ants' nests is a curious circumstance, and one which, I think, still requires elucidation. In the present case it is probable—although I could not certainly determine—that they feed upon the inmates of the nest, for of fourteen specimens taken seven are imperfect, but only in a slight degree, wanting a few joints of an antenna, a claw, or a joint or two of a tarsus, seldom a whole foot. Does not this condition rather infer that they suffer these slight mutilations in battling with the ants, which, in self-defence, would be likely enough to seize their enemies by these their only vulnerable parts? That other species so treat intruders I was once an eye-witness. In turning over a stone, beneath which was a nest of *Formica fusca*, I disturbed a pair of *Platysma niger*, one of which, to escape me, ran amongst the ants. However, this was “out of the frying-pan into the fire,” for the ants rushed upon him from all sides, like little bull-dogs, and he disappeared in the adjoining herbage with a crowd of them dangling at his legs and antennæ.—*Thomas John Bold*, in ‘*Transactions of the Tyneside Naturalists' Field Club*,’ iv. 334.

Capture of Ocypus ater on the Banks of the Wansbeck.—I have this season (1860) found *Ocypus ater* in some abundance on the banks of the Wansbeck. Starting from Sheepwash, I examined the north bank of the river down to the sea, finding amongst other things this conspicuous insect. It began to occur about half a mile above the railway viaduct at North Seaton, and all the way down to Cambois, not occurring, however, on the sea-coast. It lives beneath stones and amongst *rejectamenta*, near high-water mark. The time was near the middle of September. Previous to this only two specimens, to my knowledge, had occurred within our district,—at Tyne-mouth and Whitley,—and these were taken thirteen years ago.—*Id.*

Discovery of two Species of Ptilium new to the British Fauna, and the Description of a new Species of that Genus.—I am indebted to my friend Mr. Waterhouse for the pleasure of announcing the discovery of two species not previously included in the list of our indigenous Trichopterygidæ. One of them, *Ptilium inquilinum*, has for some time past been known on the Continent, and is well described and figured in Gillmeister's ‘*Monograph*’; it is therefore unnecessary to do more than simply to record its occurrence in England. Its companion will require a more careful notice: this insect belongs to a species hitherto undescribed, as far as my acquaintance with the family extends, and is conspicuous among its allies, both for the elegance of its shape and for the distinctness of its sculpture. It must be placed in that section of the genus *Ptilium* which includes *P. canaliculatum*, *P. cœsum*, *P. inquilinum*, &c., all of which exhibit three dorsal channels, or rather lines, on the thorax; but while in every one of the above-named the lines on each side of the central channel are so faint as to be scarcely perceptible except in a favourable light, in this species they are very deeply and strongly marked, and may easily be seen under a simple lens of no very high power; and, moreover, in all the other species the lines in question are oblique, converging towards the central line at one or the other of their extremities; but in this alone they are perfectly parallel to the intermediate line, and confined to the disk of the thorax, not reaching to either margin. The successful exertions of Mr. Waterhouse have now added three most interesting species to the list of the British

Trichopterygidæ, viz., *Micrus pulchellus*, *Ptilium inquilinum*, and last of all, and also least, the species now under consideration; and it was my earnest wish to have named this species after its captor, but—I regret to say it—he has expressly forbidden my doing so.

PTILIUM INQUILINUM.

P. inquilinum, *Maërkel in litt.*; *Erichson, Naturg. de Ins. Deuts. iii. 26.* *P. inquilina* (*Trichopteryx*), *Gillm.* *P. canaliculatum, var., Maërk.* *P. hæmorrhoidale, Mots.* *P. formicaria, Mots.* *P. exarata, Allib.*

Three specimens of this insect were taken by Mr. Waterhouse some time ago, but no note made of their capture.

PTILIUM INSIGNE, *nov. sp.*

Long. corp. $\frac{1}{4}$ lin. Rufo-testaceum, pubescens, subtilius punctatum; capite magno prominulo, lineâ transversali post oculos; pronoto transverso, capite paulo breviori, ad basim validius contracto, lateribus rotundatis, angulis acutis, foveâ magnâ transversali intra marginem posteriorem, et lineâ longitudinali mediâ profunde impressâ, cui utrinque est linea brevis parallela pariter profunde impressa, sed margine et anteriori et posteriori longe remota; scutello modico, lineâ mediâ impressâ; elytris ovatis, pronoto latioribus, apicibus acutis; pedibus atque antennis pallidis, tibiis omnibus dilatatis.

Pronoto insigniter cælato, atque tibiis dilatatis ab omnibus cognosci potest.

Length $\frac{1}{4}$ line. Rufous-testaceous, pubescent, finely punctured throughout; head large and prominent, with a transverse impressed line behind the eyes; thorax transverse, not as long as the head, much contracted towards the base, with the sides much rounded and the angles acute, with a transverse depression near the hinder margin, and a deep and wide longitudinal channel, on each side of which is a distinct and deeply impressed line, not extending to either margin of the thorax, and parallel to the central line; elytra ovate, wider than the thorax, with their apical extremities acute; scutellum moderate, with a deeply impressed central line; legs and antennæ pale testaceous, with all the tibiæ much dilated towards the feet.

This species may be known by the remarkable sculpture of the thorax, and by the dilated tibiæ.

A single specimen was taken some years ago by Mr. Waterhouse, but the exact locality of its capture is unknown.—*A. Matthews; Gumley, Market Harborough, February 1, 1861.*

Muddy Investment of Georyssus pygmæus.—During a recent ramble in Cumberland I met with a small Coleopterous insect, whose economy is very peculiar. This little beetle, the *Georyssus pygmæus* of Fabricius, is of small size, bluish-black, very strongly and distinctly sculptured. Each individual is completely coated above with a thick cover of muddy sand, under which it totters about in a conical manner. How this earthy cover is attained, and what purposes it can serve, is to me a puzzle. That it is not the result of accident I am pretty certain, for all (and I caught upwards of fifty) were so coated; indeed, it fitted them so closely that I had first to hard rub, and then wash my captures before mounting them. Even after forty-eight hours of heavy rain their loads were still intact. They frequent, on hot sunny days, sloping patches of damp muddy sand, sparsely covered with herbage, and, being nearly of the

same colour as the ground, are exceedingly difficult to detect; for unless the atoms move, you may have several under your eye, and yet be unable to see one. Does not this difficulty of detection lead to the inference that concealment from its enemies is the end sought to be attained? I think it does. The insect occurred on the banks of the river Irthing, four or five miles west of Gilsland, in the early part of June. This locality being so contiguous to our district will, I hope, be some excuse for crossing its borders in search of the materials for this note.—*Thomas John Bold, in 'Transactions of the Tyneside Naturalists' Field Club,'* iv. 65.

Economy of Apion violaceum.—In the early spring of this year I found at Long Benton a large stem of the common dock which had been perforated in a great number of places by an insect. On splitting it open I found that the perforator had been the larva of a small Coleopterous insect, the *Apion violaceum* of Linneus, which had apparently fed upon the pith of the plant, burrowing in it for six or eight inches, undergoing transformations within, then gnawing their way outwards, leaving the circular orifices which attracted my attention. I found several individuals that, after undergoing their last change, had been unable to escape,—perhaps killed by the drying of the stem, which had been severed from the root.—*Id.* iv. 66.

Transformations of Cionus Scrophulariæ.—About the 14th of July, 1857, Mr. John Thornhill brought me some stems of *Scrophularia aquatica*, on the tops of which were clustered great numbers of small gummy-looking capsule-shaped cocoons. These, ten days after, produced an abundance of a very beautiful Coleopterous insect, the *Cionus Scrophulariæ* of Linneus. The whole of the foliage of the plant had been devoured by the larvæ, all of whom had changed into pupa but one; this was rather shrivelled, somewhat onisciform, and of a yellowish green colour. The cocoons were of the size of small peas, with little protuberances on them, semitransparent, horn-coloured, or rather of a greenish horn-colour, having quite the appearance of small gum capsules, and were clustered on the tops of the plant like inverted bunches of grapes.—*Id.*

Note on the Use of the Forceps of the Earwig.—Has any one noticed the common earwig seize insects with its forceps? I saw one clasp an active beetle, *Quedius fuliginosus*, round the middle with them, raise it from the ground, and run off with it in spite of its most energetic struggles.—*Id.* iv. 335.

Note on Anisolabia maritima.—In the 'Transactions of the Tyneside Naturalists' Field Club,' vol. iv. p. 56, I stated that this fine earwig was in a fair way of becoming extinct amongst us. This opinion, I am glad to find, is erroneous. In August and September of 1860 Mr. Perkins and myself found it tolerably abundant, and of all sizes, in its old locality—to wit, the large ballast heap on the sea-shore, near South Shields.—*Id.*

Economy of Serropalpus humeralis.—As this insect, formerly a rarity in this country, has lately been taken in considerable abundance, some slight account of its economy cannot be otherwise than acceptable to the readers of the 'Zoologist.' I therefore extract the following paragraph on the subject from the pen of M. E. Perris, published in the 'Annals of the Entomological Society of France' for the year 1857. "Under the influence of the first showers at the end of August or beginning of September there is developed on the old stumps of fir trees, as well as on such of their larger roots as approach the surface of the soil, a large fungus of moderate thickness, of a yellowish brown colour and spongy substance, sometimes sessile, sometimes supported by a stout but short foot-stalk; it is described by Brotero under the name of *Polyporus maximus*, and properly belongs to the genus *Dedalæa*. It is to this fungus that the *Hallomenus*

resorts to lay its eggs, and on it the larva feeds, often associated in large numbers. In the substance of this fungus it excavates winding galleries, appearing to prefer the thinner portions, or at least parts of moderate thickness, to the thick and more coriaceous parts about the foot-stalk. It feeds for about six weeks, and then, having attained its full size, it makes a hole through the under side of the fungus and drops to the earth, in which it buries itself and awaits the following summer to undergo its final metamorphosis. Once only have I known the metamorphosis completed in the fungus itself; collected in October and enclosed in a glass vessel, both the larvæ and pupæ were much better preserved thus than when procured from the earth; sometimes I have had the pleasure of collecting more than two hundred specimens in a day." The perfect insects were observed by Mr. Lewis on the fir post and rail fence at the railway-station at Charlton, the larvæ and pupæ in a fungus which grew just at the junction of post and rail.—*Edward Newman*.

Hexagonal Form of Bees' Cells.—There can be no doubt as to the liability of cylinders to become hexagonal under a certain amount of pressure; but why are we to infer that the hexagonal cells of bees have been thus formed? Colonel Newman has proved (*Zool.* 7369) that the hexagonal form does not result from the pressure of the honey contained in the cells. Where, then, is the pressure to come from? But granting, for the sake of argument, the presence of compressing force where, surely, none can exist, would it make the comb what it is? I think there are several objections which may be urged against this. First, would the extreme fragility of the walls of the cells admit of their receiving, without breaking, the very considerable amount of pressure necessary to make them apply to one another without leaving any interstices? Then, the bases of the cells are, as every one knows, sculptured in the previously-formed partition, before the sides are begun. Now, would not the effect of subsequent pressure be to force each cell at least partially from its base? And if, as would probably be the case, its adhesive power were sufficient to resist this force, would not the sides be distorted, or at least thrown out of their original position? Again, the cylindrical cells must be either larger or smaller in circumference than the hexagonal ones they are required to form; if smaller, they must stretch in compressing, in order to fill up the interstices, which is absurd. On the pressure theory, then, they must be made larger than the required size of the hexagonal cells, to allow for the effects of the compressing force! Is not this attempt, then, to explain away the mathematical accomplishments of the bees something like accounting for a lesser difficulty by creating, as it seems to me, a greater; to say nothing of the apparent insufficiency of compression to produce the solid angle which is contained by the base of each cell. I should be very much obliged to any of the advocates of the pressure theory who would answer these queries satisfactorily.—*B. Carron; Loxton Rectory, near Axbridge, Somerset, February 18, 1861.*

[Of course the pressure hypothesis cannot be entertained unless the article pressing be specified: the only articles in contact are—1st, atmospheric air; 2ndly, honey; 3rdly, larvæ and their cocoons; 4thly, the locomotive bees. When the advocates of the hypothesis explain from which of these sources the pressure arises, and how it acts, we shall have the means of considering the matter, but not until then.—*Edward Newman.*]

Note on Ilyanthus Mitchellii.—Whilst staying at Hastings in the spring of 1860, I had the good fortune to obtain a very fine specimen of this rare anemone. It was found by a boatman, in a hole in a rock about six miles eastward of Hastings. It was certainly a splendid animal, and from its size and bright colour attracted general attention and admiration. In its shape, when open, it very closely resembled a thick stumpy young carrot; when closed it assumed a pear-like shape. The length of the column was 3 inches; diameter at the disk 1 inch, from whence it increased in size for about one-third its length, until its diameter measured $1\frac{1}{2}$ inch, thence decreasing gradually to a blunt point. At this lower extremity there was generally a very decided indentation, sufficiently large to admit easily a good-size probe; this, however, was not permanent, but was caused by the retraction of the terminal point (just as the top of a finger of a glove might be turned inwards), for it was occasionally reversed and thrust out to a sharper point: no orifice could be detected. The surface of the hide was smooth, the upper portion covered with a mucus thickly coated with sand, which was easily removed without injuring the animal, and did not re-form. The column was carrot-colour; round the top a band, three-eighths of an inch wide, of alternate squares or "turrets," of violet and opaque white, very clearly defined (in this band it very strongly resembled *Bunodes coronota*). The disk was round, of a translucent brown, with alternate lines of a darker colour and white; round the mouth a row of patches of dark brown; radii distinct; the mouth raised on a cone; the lip, throat and stomach coarsely furrowed, the upper edges of each furrow being of a beautiful deep rich carmine; the stomach was often obtruded over the whole of the disk, and from the bright hue of its colouring presented a most brilliant appearance. The tentacles, forty in number, set in two rows, were somewhat slender, about seven-eighths of an inch long, usually curled; their colour a pellucid white, elegantly marked on the front faces with alternate bands of brown and opaque white: they were seldom retracted. The anemone did not seem very sensitive to the touch, and would stand a considerable amount of irritation without closing; it was generally fully expanded night and day. I afterwards obtained a second specimen, much smaller, which agreed in all points with the larger one, excepting that it was much more sensitive to the touch. Both were placed on sand, in which the smaller one partly burrowed, and raised itself into an upright position for a few days. They lived about three weeks after they came into my possession.—*Edward C. Holwell*; 49, *Union Grove, Wandsworth Road, January 26, 1861.*

Ophiocoma filiformis, Müller, on the *Durham Coast*.—I have lately procured examples of *O. filiformis* from the stomachs of haddocks taken off Hartlepool. This is, I believe, the first time that the species has been noticed on the eastern coast of Great Britain. It was first procured by Professor Forbes in the Firth of Clyde, where I have also dredged it; and it was subsequently taken in the Loughs of Connemara. These are the only recorded localities. It inhabits mud. The specimens observed from this coast differ from those I have taken at Rothesay in having the scales at the origin of the rays more nearly parallel, and the outline of the disk less irregular. The anchor-headed spines peculiar to and characteristic of this species are, as far as my observations go, few and far between, though some may always be detected.—*Alfred Merle Norman*, in '*Transactions of the Tyneside Naturalists' Field Club*,' iv. 337.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

Anniversary Meeting, January 28, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Election of Officers, &c.

Messrs. J. W. Dunning, H. G. Knaggs, R. M'Lachlan and G. R. Waterhouse, were elected members of the Council, in the room of Messrs. J. E. Gray, F. Grut, E. Sheppard, and S. J. Wilkinson.

J. W. Douglas, Esq., was re-elected President; S. Stevens, Esq., Treasurer; and Messrs. E. Shepherd and E. W. Janson, Secretaries.

The Report of the Library and Cabinet Committee, made to and adopted by the Council as their Report to the Society, was read and received.

The President delivered an Address on the state and future prospects of the Society and entomological Science, for which the Meeting passed a cordial vote of thanks, and ordered it to be printed in the Society's 'Proceedings.'

A vote of thanks to the retiring Members of the Council was also passed.



February 4, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'Mémoires de la Société de Physique et d'Histoire Naturelle de Genève,' Tome xv., Deuxième Partie; presented by the Society. 'Proceedings of the Royal Society,' Vol. xi. No. 42; by the Society. 'Journal of the Proceedings of the Linnean Society,' Supplement to Vol. v., Botany; by the Society. 'Annales de la Société Entomologique Belge,' Tome iv.; by the Society. 'Sulla Monografia del Bombice del Gelso del Dottor Emilio Cornalia, Relazione di Antonio Villa;' 'Osservazioni Zoologiche eseguite durante l'eclisse parziale di sole del 18 Luglio, 1860, communicate dal Socio Antonio Villa;' 'Straordinaria apparizione di insetti carnivori, di Antonio Villa;' 'Sui Curculioniti dell'agro Pavese enumerati dal Dottor Prada, Relazione letta nella seduta 18 Dicembre, 1859, della Società Geologica in Milano dal socio fondatore Antonio Villa, Vice-Presidente della Società Stessa;' by the Author. 'The Journal of the Society of Arts' for January; by the Society. 'The Farm and Garden,' Nos. 23 and 24; by C. A. Wilson. 'The Zoologist' for February; by the Editor. 'The Athenæum' for January; by the Editor. 'The Entomologist's Weekly Intelligencer,' Nos. 223 to 226 inclusive; by H. T. Stainton, Esq.

Election of a Subscriber.

Joseph Holdsworth, Esq., of 54, Lombard Street, London, was balloted for and elected a Subscriber to the Society.

Exhibitions.

Mr. Janson exhibited a specimen of *Philonthus punctiventris*, Kraatz ('Naturgeschichte der Insecten Deutschlands,' ii. 578, 10; 1857), and made the following observations respecting the species:—

“Nearly allied to *P. carbonarius*, *Gyll.*, from which it is readily distinguished by its slender antennæ, of which the penultimate articulations are but slightly transverse; by the deep and close punctuation of the region of the head behind the eyes, and by the green tint of the elytra. These characters, and the simple anterior tarsi in both sexes, will also serve at once to distinguish it from *P. æneus*, *Rossi*.”

“This species has not hitherto been recorded as British. The specimen now exhibited, the only one which I have seen, was taken, in the autumn of last year, near London, by my friend Mr. Edwin Shepherd.”

Mr. Walker exhibited, on the part of Mr. F. Smith, some very small white pupæ-cases that were found attached to wasps' nests. These pupæ are very finely striated, and their size is so very minute that they might have been mistaken for eggs if Mr. Smith had not discovered the skin of the larva inside.

Mr. Walker also exhibited, from Mr. Smith, some larvæ taken feeding on the refuse of hornets' nests.

Mr. Westwood considered them to be the larvæ of an *Anthomyia*, and probably of *A. canicularis*.

Mr. Stevens exhibited some beautiful Saturniæ and other Lepidoptera, sent from Port Natal by M. Gueinzus; and some extraordinary Tineina from Bootan.

Mr. Bond exhibited a specimen of *Cidaria reticularia*, *W. V.*, one of three examples taken in the Lake District, in 1856, by Mr. T. H. Allis. The species had not previously been recorded as an inhabitant of Britain.

The Secretary read a paper by T. V. Wollaston, Esq., intitled “On the Atlantic *Cossonides*.”—*E. S.*

DUBLIN NATURAL HISTORY SOCIETY.

January 4, 1861.—WILLIAM ANDREWS, Esq., M.R.I.A., President, in the chair.

The following donations were announced:—‘The Annual Address of the President of the Linnean Society;’ presented by the Author, Thomas Bell, Esq., F.R.S. ‘Suggestions for forming Collections of Birds' Eggs;’ by the Author, Alfred Newton, M.A.

Note on the Occurrence of the Snowy Owl in the County Mayo.

The Secretary read the following communication, by Alfred Newton, Esq., M.A.:—“As the snowy owl is stated by the late Mr. William Thompson, in his admirable work on the ‘Birds of Ireland’ (p. 95), to be ‘a very rare winter visitant’ in that country, a record of the capture of one which I lately had the pleasure of seeing may not be unacceptable. The bird I speak of was obtained at Ballycory, in the county Mayo, on the estate of Mr. George Clive, Under Secretary of State for the Home Department, and, as far as I could ascertain, somewhat late in the autumn of 1859. When first observed it was sitting on a bog, and was approached without difficulty. The man who found it had no idea what it might be, and shot at it, wounding it slightly, but sufficiently to enable him to catch it alive. It soon recovered from the injury, and lived contentedly in a roomy cage until the beginning of October last, when, at my suggestion, Mr. Clive presented it to the Zoological Society of London, in whose Gardens I saw it a week or two since, enjoying the society of a fellow prisoner of its own species, which was obtained in Unst, the northernmost of the

British islands, and which has been for many years in the Society's possession. I was told by the man who looked after Mr. Clive's bird that it moulted its feathers towards the end of the summer; and it certainly was in beautiful plumage when I saw it at Ballycory the last week in September. I may perhaps be permitted to add that, as far as my own knowledge extends, we are without any certain information respecting the change or changes of plumage in this species; and I believe that any person who could furnish reliable facts bearing on this subject would be doing good service to Ornithology."

Professor Kinahan remarked that this bird had been recorded in the winter of five various years, since 1812, in Ireland, in one of which, 1835, it had occurred in Antrim, Tyrone, Longford and Mayo. The specimen from Tyrone was in the Society's Museum, having been presented by Edward Waller, Esq., in 1837. It had occurred in Down and Donegal. The last occurrence which was recorded was of a pair which occurred to Professor Kinahan himself, in December, 1853, in Tipperary.

Mr. J. B. Doyle remarked that he had seen, some time since, a fine specimen of the snowy owl, in the possession of his friend Mr. Rutledge, of Ballinrobe, county Mayo, in which neighbourhood it had been procured in the winter of 1839. This specimen appears to have been hitherto unrecorded.

Occurrence of Alosa communis near Killaloe.

Professor Kinahan, on the part of the Rev. C. Mayne, of Killaloe, exhibited a specimen of the allice shad (*Alosa communis*) which had been captured in the pots of the eel fisheries, a mile from Killaloe. The common shad (*A. finta*) is a well-known migrant to some of our southern rivers, and has also occurred in the north and east. The distinctions between the two species are very striking.

The President said the allice shad is distinguished from the twaite shad (*A. finta*) by not possessing teeth, the absence of the lateral lines and spots, and its being altogether a larger and coarser fish. It is allied to the Clupeidæ, or herrings. Although so little appears to have been recorded of its localities, it is by no means of uncommon occurrence on the west coast. It has been seen in Kenmare River, in Ventry Harbour and Dingle Bay, and is frequently abundant in Limerick Harbour, and Brandon Creek, on the coast of Kerry. In the latter place it has been taken of large size, in bag-nets set for salmon. This new locality in the Shannon is therefore of additional interest. The allice shad is a marine species, and only leaves the salt water for a period, in the early summer, to deposit its spawn in fresh water, where it is sometimes also met in the autumn months. Where deep-water rivers run into a bay or estuary the shad ascends the river some distance from tidal influence, and frequents the stillest part of the river to spawn.

Mr. J. B. Doyle presented and exhibited to the Meeting a collection of marine Zoophytes and Polyzoa, obtained on the shores of Dublin Bay. He deferred any remarks till the completion of the collection.

The Rev. F. Vize, of Bray, and the Rev. Charles Mayne, of Killaloe, were elected Corresponding Members; and George Dawson, Esq., was elected an Associate Member.—*W. A.*

Observations on Squirrels. By WILLIAM HENRY SLANEY, Esq.

MANY persons are impressed with the belief that it is habitual to these active and amusing little animals to form nests or drays, and therein to lay up in a dormant state, or nearly so, during the greater part of the winter months, and that they have also the forethought of collecting, before the frosts and snows set in, a hoard of provisions, to which they can in an emergency resort until the weather becomes more open and they feel inclined to shake off their winter's sleep and sally forth for food, and even should a repetition of severe weather drive them back to hybernate still longer in their former retreats. This is a very general opinion with many persons, but I believe it to be totally unfounded; at least I can speak with confidence that it is not a general rule, and that in this vicinity hybernation never takes place, but that the squirrels are about at every period of the year. In the immediate neighbourhood are great numbers of remarkably fine beech trees, and opposite to the windows where I am writing there are groups and single beech trees, dispersed about the lawn and adjacent walks, of a large size, some measuring more than 300 feet in circumference round the extreme ends of the branches, and upwards of a hundred feet in height, and which, when in full leaf, have a most splendid appearance. These noble trees in general bear an immense quantity of beech-masts, or "nuts," as they are sometimes called, and which, towards the end of summer, from the heat of the sun, split open, and the kernels or seeds fall to the ground, though an endless number still remain on the trees during the winter months, and form, with those under the trees, a most attractive food for many kinds of birds, as well as squirrels and other animals, and amongst the birds none are more fond of this sweet and fattening food than the wild wood pigeon, of which large flocks, containing many hundreds in each, arrive here in the winter months, in addition to those that remain and breed here during the summer; and in such numbers do they resort to feed on the beech-masts, that during a few months of the winter of 1858 I killed upwards of a hundred couples of these most excellent birds for culinary purposes; and this year, though absent during much of the severe weather, and most favourable time for obtaining them, I have killed more than seventy-three couples.

While waiting underneath the trees for the arrival of the pigeons, concealed in a stalking-house or little cabin, and in the hardest weather, when frost is most severe and snow often laying on the

ground, it is a very common occurrence to see three or four or more squirrels running along the branches of the trees above, and often descending to the ground to seek for the fallen masts; and if they chanced to see or suspected any one was concealed within the cabin, they immediately decamped, running up the trunks of the trees, and began chattering and stamping with their little feet in a most angry manner at the audacity of any one daring to intrude on their domain. In the shrubbery also, nearer to the house, every day during the severest winter months, as well as at other times, numbers of squirrels may be seen running about, unmindful of the frost and snow, active and lively as ever, and they will often come close to the windows, on the grass-plot beneath, and look up as if asking to be fed, and then begin busily searching about in the snow; nor do they hesitate to run up to the window-sills and get into the trays placed there for the little birds, and filled with bird-seed, pieces of bread, mashed potatoes, Spanish chesnuts and other food, as well as a few nuts put for the squirrels especially; but when these latter are consumed they take to the other sorts of food most freely, driving all the poor birds away until they have finished their own individual repast; and most amusing it is when two or more squirrels meet to dispute which shall have the tray to itself.

During the late inclement month of January numbers of these little active animals might have been seen scratching vigorously amongst the moss and grass for the beech-masts and other food blown there by the high winds and concealed beneath; and I have never observed that they resorted to any hoard or store of food which had been previously laid up in any quantity for winter consumption, as some suppose is the case, though no doubt they do conceal and deposit in certain hiding-places a few nuts and other dainties, nor have I ever noticed any of the winter nests or drays they are said to hibernate in, though in the spring many of these drays may be seen, in which the squirrels breed and have their young.

There is a variety here, which I have never met with or heard of elsewhere, having buff or straw-coloured tails, which give them a curious appearance while whisking them about as they sit on the ground or run round the trunks of the trees, peeping cautiously at the persons watching their motions. There seems to be no difference in their habits, and they mix together promiscuously. Mr. Jesse, it is true, states that he has heard of squirrels with white or gray tails; but these are yellow or straw-coloured, without any mixture of white or gray.

I once detected a squirrel in the act of carrying off a mushroom as a dainty morsel, and was told afterwards by a keeper that he had often seen them do so at a wood some distance from this place. In addition to the dainty mushroom I have known my little favourites frequently, and when other food was plentiful, to scale the garden-walls and steal the young apricots, which they carried off as choice morsels to their haunts amidst the beech and other trees.

I have heard it stated that squirrels will destroy birds' eggs, and even kill and eat the young ones, and it is mentioned as a well-known fact by Mr. Jesse; but as to their habitually devouring young birds or the eggs of birds I have the greatest doubt. Perhaps in the exuberance of its spirits in the spring time the little squirrel may indulge itself in taking a peep into some poor bird's nest it may chance to meet with, and by accident, possibly, or from curiosity, it might break an egg, just to ascertain what it is like; but, except in particular situations, or where there are young fir and larch plantations coming up, or in the immediate vicinity of orchards, or where the poor squirrel has not room and verge enough to live in, I believe a more harmless, active and amusing little animal does not exist, when living amidst its natural wild and woodland scenery. In consequence of being protected here, and having an ample supply of food all the year through, with range enough amongst almost every variety of tree, I am happy in being able to state that no day passes, winter or summer, but numbers of these amusing, merry and happy little fellows may be seen chasing one another about, and taking astonishing leaps from tree to tree, hardly ever missing their footing while doing so, or may be met with beneath the trees and in the walks, either running along in pursuit of each other, or busily engaged in searching amongst the moss for masts and nuts, looking up from time to time to see if any one is likely to disturb them, and ever and anon flourishing their upcurled tails over their heads, like banners of defiance to all intruders.

In conclusion, I may reiterate that I cannot credit the statement, so implicitly believed by many, as to the dormant nature of squirrels during the winter months; for, as before stated, at every period of the year, let the weather be what it may, however severe,—while snow still lies on the ground and the frost is intense, and other animals appear starved and miserable,—I have never missed seeing the little squirrels as actively and busily running about as at other more favourable times, though evidently often pressed for food by their coming so fearlessly to the window-sills and taking possession of the

bird-trays, and placing themselves therein with evident delight, and by their allowing a spectator to approach near enough to them to watch their merry pranks while driving away their less resolute and pugnacious companions, obliging them to wait beneath for any godsend that may chance to fall to their lot from the master of the tray above.

WILLIAM HENRY SLANEY.

Hatton Hall, February 20, 1861.

[This fact in the life-history of the squirrel is not quite new, as the following queries by Rusticus of Godalming will show. “They sleep a great part of the winter, like the alpine mouse, and very soundly, for I have seene when no noise of hunters could awake them with al their cries, beating their nests on the outside, and shooting bolts and arrowes thorough it, vntil it were pulled assunder, wherein many times they are found killed before they be awaked.’ The preceding paragraph, taken from Topsell’s ‘History of Four-footed Beasts,’ records a faith in the torpidity of the squirrel, which, from the time of Aristotle, has never been disturbed. It is, therefore, both of venerable antiquity and of universal acception. Now I am sorely perplexed whether to give you an account of this torpidity on the authority of authors, or to skip it altogether, or to attack it tooth and nail. I will take a middle course, and recite under the fashion of queries a few doubts that have occurred to me. We commonly see squirrels every month in the year—on the shortest day equally with the longest; when, therefore, does torpidity begin, and when does it end? Again, the hoarding of provender; that fact is patent: what is the object?—is it devoured during torpidity? Are not these hoards rather an evidence that during the winter the squirrels are not only awake, but hungry? Again squirrels migrate: in this island we see it in a small degree, and rather as an exception than a rule; but on the continents of Europe and America it is the rule. Vast multitudes move southwards at the approach of winter, northwards at the approach of summer; this is perfectly notorious: why should not squirrels become torpid in New York and Massachusetts?—why should they enter Florida before assuming torpidity?—why should the squirrels of Russia pass the Balkan before they doze? I believe a squirrel may sleep more soundly on a cold frosty night than a house-dog stretched before a comfortable fire, but I have yet to learn the exact point where sleep ends and torpidity begins. If torpidity means a sleep enduring for weeks, or even days, I still doubt whether there is positive evidence of it among our squirrels.” —*Chambers’ Edinburgh Journal*, No. 329].

Hints which may be useful to Egg Collectors.

By STEPHEN STONE, Esq.

IT is to be regretted that while in Mr. Newton’s admirable paper on collecting and preserving eggs (*Zool.* 7189) the student is fully instructed how to proceed in order to avoid breakage in blowing, packing, and in the transmission of specimens from one correspondent

to another, or from one place to another, no instructions are given for repairing fractures when they unfortunately occur. Now, notwithstanding all the care that may be taken, and in spite of every precaution, accidents will at times happen, and such fragile objects as eggs will sustain fractures, which, if not attended to or repaired must at all times endanger their safety on being handled, and may lead to their utter destruction; and as there are eggs which, if destroyed, it would be next to, if not wholly, impossible to replace, it is of importance that such an occurrence should be guarded against by all possible means. Patches of paper applied externally over a fracture have an unsightly appearance, and, moreover, conceal a portion of the markings which characterize the egg, except in the case of such as are of one uniform colour; this method of repairing a fractured shell is therefore objectionable. The plan I hit upon when I began to collect, and which I find to answer the purpose well, is this: When an egg I especially wish to preserve has become badly fractured I pour in at the aperture through which the contents were withdrawn a small quantity of a moderately strong solution of gum arabic; this, by turning the egg about for a few seconds, is made to pass over the entire inner surface of the shell, so as to leave thereon a thin coating of adhesive matter; if more than suffices for that purpose has been introduced the overplus is returned through the aperture; a quantity of finely-powdered chalk is then poured in, and the egg turned about as before, when the chalk unites with the gum and forms a crust upon the shell, which becomes, when dry, as hard and firm as the shell itself, uniting the fractured portions and rendering the specimen almost as safe to handle as it was before it became injured, while by this process no unsightly appearances are caused on the outside. Should the fractures extend only over a portion of the shell, it will not, of course, be necessary to form a crust upon the entire surface, but only upon, and immediately around, the injured part. If the crust first formed should not be considered sufficiently strong, it may, after allowing it time to dry, be strengthened by repeating the process described above.

If portions of the shell have become detached, the pieces must first be secured in their proper places by the outward application of gummed paper, which, after the formation of the internal crust, may be removed, but not until it has become dry and firm, and even then care must be taken to damp the paper but very slightly, for if too much moisture be applied it will find its way through the cracks in the shell, and by relaxing the crust undo all you have done.

If any of the detached pieces have been destroyed or are lost, pieces of paper corresponding in shape with the various openings, but of larger size, must be cut, and slits of some depth and pretty close together made with a pair of scissors all round the edges (see Mr. Newton's paper, fig. 21, Zool. 7198), so that the proper degree of convexity may be given to each piece according as that part of the shell to which it is to be applied is more or less convex. The pieces must then be introduced into the openings they are intended to fill up, and gummed on to the inside; a bit of stick or a piece of wire introduced through the aperture originally made in the shell for the purpose of emptying it of its contents will materially assist in the operation, which a little practice will enable the operator to perform without much difficulty. Then when the inner crust has been formed and has become dry, pounded chalk mixed with a solution of gum arabic, so as to be of about the same consistence as soft mortar, should be spread evenly over the paper to the thickness of the shell; this will tend greatly to strengthen the injured specimen. If the operator chooses to make the composition resemble the real shell it can be done by applying the requisite colouring matter. I do not anticipate any objection to a restoration of the kind on the ground that it may be made so perfectly as to enable a dishonest person to practise imposition in the sale or exchange of a specimen so treated, for although in the cabinet drawer or at a distance it may look very well, a close inspection will enable any one to see clearly enough what has been done, however ingeniously the restoration may have been effected.

In one of my birds' nesting excursions, an excursion which took place soon after I began to collect, I found a nest containing one egg which I could not make out. In the hope of being able to obtain an additional number of eggs, as well as the opportunity of ascertaining what description of bird it was to which the nest belonged, I allowed it to remain undisturbed, but in the course of the night following the egg was destroyed by vermin of some kind (I believe the depredator to have been a field mouse); I therefore lost my specimen and with it all chance of identifying the bird that produced it. This was a lesson I did not forget, but by which I was resolved to profit, so on my next excursion I took care to provide myself before starting, and take with me a number of common birds' eggs of various sizes and kinds, and whenever I chanced to meet with the nest of a bird at all rare that had begun to lay, but had not produced the full number, I at once made sure of the specimen or specimens the nest contained, substituting for them some of the common ones I had brought with

me which most nearly approached them in size and colour ; thus, though all the eggs the bird had laid had been removed, she was not driven to abandon the nest, but induced to go on laying, so that there was every probability of one's being able to obtain an additional number of specimens on a future visit, and also of having the opportunity of clearing up any doubt about the species, if doubt upon the point existed. This plan succeeded, and all went on well for a time, but having upon one occasion placed the egg of a whitethroat in a reed warbler's nest as a substitute for the one it previously contained, and which I took possession of, it was destroyed the following night, like the one already alluded to, by vermin, the consequence of which was that the bird abandoned the spot without laying again. I now substituted models cut in chalk or freestone, and coloured for real eggs, and these I have found to succeed admirably, as the bird will readily lay to them and there is no danger of their being destroyed or even removed by vermin.

The nests of some species are situated in holes, from which it is often difficult, and in some cases impossible, to obtain the eggs without the aid of an instrument of some kind ; those I use are very simple in construction, and I find them very effective. I will endeavour to explain how they are made : I procure a piece of wire, of the size and length I think necessary, and taking hold of one end with a pair of pliers, I coil it once round the point, which should be so small that the diameter of the first coil may not exceed a quarter of an inch, if the instrument is intended for small eggs ; I then, by shifting the pliers as occasion requires, coil the wire round again with a wider sweep than before, giving it a spiral direction, and then again with a still wider sweep, then twice or thrice with a width of sweep about the same as the last ; thus the bowl, as it may be termed, of your instrument is formed, while the uncoiled portion of the wire, which may be of any desired length, serves for the handle. For small eggs, such as those of the wryneck, nuthatch, titmouse, &c., wire of the size of a common knitting needle will be proper ; for large ones, such as those of the tawny and barn owl, &c., much larger and stiffer wire must be used ; and for those of an intermediate size, as the starlings, green woodpeckers, &c., an intermediate sized wire will be best. The dimensions of the bowl of your instrument must of course be proportioned to the size of the egg it is intended for.

The advantages attending instruments of this description are, that you can make them without the least difficulty yourself ; they can be made in a few seconds, and of any size, and they can

easily be bent in any direction, so as to be effective under all circumstances, or let the course of the hole in which you are about to introduce one be what it may; thus, if it be directly downward, the direction from the mouth to the bottom of the bowl, as it may be termed, of your instrument should be, and by a bend you may in a moment make it become, almost parallel with the handle, while if the hole should take a horizontal direction the bowl must be made to form a right angle or nearly so with the handle, which can also be effected in an instant. If the handle should not be found long enough to reach the bottom of a hole, a piece of stick of the required length may be attached thereto by means of a bit of string, a supply of which, with a knife, you would do well always to carry with you.

These instruments are not only useful in abstracting eggs from holes in trees or walls, but, lashed to a stiff rod or slender pole of sufficient length, they are of use in obtaining specimens from nests of birds of aquatic habits situated among flags, &c., growing in rivers, lakes or ponds, which it might be difficult to obtain in any other way. I invariably adopt this plan in taking the eggs of the little grebe, moorhen, coot and some other species, unless the nest should chance to be so near the margin as to be within reach of one's arm.

Occasionally it happens that nests are situated in pines and other trees, the lower part of whose trunks, to the height, it may be, of twenty or thirty feet, are destitute of limbs. Once up to the limbs the ascent may be easy enough, but the difficulty lies in reaching them, for the trunk may be too large in size, and too slippery withal, to allow you to climb up it: to meet the difficulty I provide myself with a strong cord or light rope, not precisely the kind of thing by means of which Romeo mounted up to Juliet's chamber,—“cords made like a tackled stair,”—but simply a rope in which I form a series of loops: each loop should be so large as to allow you easily to “put your foot into it.” They should be about two feet apart, and in number sufficient to enable you to attain the object you have in view, at whatever height that may happen to be. The unlooped portion of the rope must be long enough to reach from the limb or branch it is passed over, to the foot of the tree, where it must be secured by some means, unless you chance to have an assistant with you who can hold it while you ascend and descend. The way I pass the rope over the branch—which, in order that one may not be swung about, or go whirling round in a manner the very reverse of agreeable, I always take care shall be at a point close to its junction with the trunk—is this: I attach a piece of string of sufficient length to the end of the rope, then tie a stone or

some weighty object securely at the end of the string ; the stone being thrown over the branch of course carries the string with it, and thus the rope is drawn over. The rope being secured the ascent may be made.

In conclusion I may observe, with reference to the tawny owl (*Strix aluco*), that although it may generally, as stated in Mr. Newman's most useful paper on the nesting of British Birds (Zool. 7397), be found to make use of the deserted nest of a crow, it in this neighbourhood appears to give the preference to the nests of jackdaws situated in hollow trees, or to hollows in trees unoccupied by nests, laying its eggs upon the decayed wood. I have known three sets of eggs, the produce of one pair of birds in one season, removed from hollow trees, the birds selecting a fresh tree each time. My first specimens were fished up, by means of one of the instruments I have described in this paper, from a jackdaw's nest situated at the bottom of a hole upwards of four feet deep, which took a slanting direction in the decayed limb of an aged elm. These facts make me think it probable that in all neighbourhoods in which hollow trees abound—as they happen to do here, though I question whether such a circumstance is of frequent occurrence in this money-making age, landholders generally taking care to put all the timber growing on their estates into their pockets before it has the chance of becoming hollow — the tawny owl will be found more frequently to resort to them for the purpose of incubation than to the deserted nests of crows, magpies or rooks, in consequence of the former situations affording a much greater degree of shelter, if not of security, than the latter.

S. STONE.

Additions to Mr. Crotch's Notes on the Fauna of Shetland (Zool. 7337).—I perceive, with regret, that in assisting Mr. Crotch to draw up his list of the birds of Shetland, I accidentally omitted to mention several of the following species. The remainder were observed subsequently to Mr. Crotch's departure from these islands.

Phœnicura ruticilla. Last October I saw a fine male of this species in the garden at Halligarth, immediately after a heavy gale from the S.W.

Sylvia hortensis. Occasionally seen in autumn.

Motacilla alba. Several years ago I observed a pair near Lerwick.

Fringilla carduelis. Rarely seen.

F. canescens. A few small flocks, consisting entirely of males, appeared at intervals during the month of October. Some betook themselves to the hills, while others seemed to prefer the garden at Halligarth, where, for many days afterwards, they continued to exhibit their well-known partiality to the alder. I shot three, all of which were distinctly tinged with rose-colour upon the breast. The stomachs contained seeds, a

few minute insects, and a quantity of fine gravel. *F. canescens* may roughly be said to differ from *F. linaria* in the following particulars: it is nearly an inch longer; the breast is lighter in colour; the rump is white, or nearly so; the bill is larger, and is dull yellow instead of light brown.

Emberiza schœniclus. I saw one last week feeding with a small flock of common buntings.

Rallus aquaticus. This bird was unknown as a visitor to Shetland until it was observed here last November by my brother-in-law, Mr. Thomas Edmondston. During the heavy snow which prevailed at that time, the bird obtained the greater part of its food among dead leaves, brushing them away with its wings, and laying bare the ground beneath.

Cygnus Bewickii visits these islands regularly in spring and autumn, resting upon the lochs, and seldom remaining many hours. Two were shot from a small flock last week, during a strong southerly gale, but were so exhausted that when the first was killed the survivors merely waded a short distance further in the shallow water, remaining there until the second shot was fired, when they at length took wing and wearily resumed their northward flight. The cry of this species very much resembles the trumpet-like note of the domestic goose.

Anas nigra. A female specimen was obtained by me last November. The olive-green legs and feet enabled me immediately to recognise the species. The stomach contained nothing but two small white stones.

Larus Sabini. I have met with but one example of this rare bird. It sailed round me repeatedly as I stood loading my gun, thus affording me an excellent opportunity of observing its plumage and general appearance. Its black feet first attracted my attention. Unfortunately it was long out of shot before I was ready to fire.

Larus capistratus has been shot here upon several occasions, one of which has been recorded by Yarrell.

The supposed example of *L. Rossii* mentioned by Mr. Crotch was shot by me seven years ago, but, under the impression that it was merely a variety of some other species, I foolishly suffered it to be lost. However, I made a few rough observations upon the singularity of its plumage, but having left my note-books in England I am at present unable to throw further light upon the subject.—*Henry L. Saxby; Balta Sound, Shetland, February 27, 1861.*

Rare Birds observed during the late Severe Weather.—If your correspondents from all parts of the country could be induced to send notices of such rarities as have appeared in their several districts, a vast amount of excellent information would be obtained. In my own locality a few rare visitants appeared. During the severity of the frost about Christmas, a fine flock of hoopers came to the Trent, and settled for the night upon the ice, but next morning they departed. Their grand trumpet-like notes could be heard at an immense distance. Another rather rare visitant—the tufted duck—came to the Trent, and, so long as some parts of the river were free of ice, continued with us. This duck only appears here in hard winters. Small flocks of from two to eight or nine came to the Trent, continued for some weeks, and were almost the only living beings about the river. It is somewhat singular that these flocks consist almost entirely of male birds; a female rarely occurs. Their deeply-marked plumage of black and white renders them very pretty objects as they ride at anchor upon the bosom of the water, or dive, as they occasionally do, and then reappear. Near the village of Swarkeston a mountain finch was shot out of a little flock. This

bird is an uncommon visitant here, and usually occurs but in very severe winters.—*John Joseph Briggs* (in the 'Field'); *King's Newton, Derbyshire*.

Kestrel Nesting in a Hollow Tree.—I was somewhat surprised that Mr. Newman in his "Collected Observations on the Nests and Eggs of British Birds," (Zool. 7396), when describing the situation of the nest of the kestrel should notice as unusual its being built in a hollow pollard oak, as in one of the only instances I can call to mind of finding the nest it was similarly situated, that is, in a hollow stump. The tree was in the vicinity of Bognor, and some boys had just succeeded in climbing up and abstracting the eggs previous to our arriving at the spot, and told us that the two owls (as they called them, on account of their feathered legs) had been flying round the tree while they were engaged in their work of spoliation. We purchased the eggs from them, and they proved to be those of the kestrel.—*John Henry Belfrage*; 7, *New Inn, Strand, March 5, 1861*.

Occurrence of the Buzzard near Swansea.—A buzzard was caught in a rabbit trap on the 10th inst. at Bryn-awel in this neighbourhood. It is a female specimen, and measures from the tip of the beak to the end of the tail, 22 inches; across the wings, 4 feet 1 inch; and weighs 2lbs. 6½ ounces.—*D. Williams*; 56, *Wind Street, Swansea, February 14, 1861*.

Habits of the Swallowtailed Kite (Falco furcatus) in Guatemala.—Proceeding on our journey, and passing over the brow of a hill which rose considerably above those surrounding us, we suddenly saw, on the slope beneath us, a large number of swallow-tailed kites gliding backwards and forwards through the air, directly over the road which we were pursuing. They were near the ground, many of them within ten or twelve yards of it, and numbered from a hundred and fifty to twice that quantity. They were closely packed, not one straggling for a moment from the rest, and reminded one of our English swifts (*Cypselus apus*) as they congregate in flight round an old and lofty edifice. My companion was surprised, no less than myself, to find so many of these birds in company; for, according to the experience of the Coban hunters, they generally go in pairs, although three or four may be occasionally met with together. A few yards of precipitous descent brought us immediately under the birds and into a swarm of bees upon which they were feeding. The swarm was slowly skirting the hill in compact order, its persecutors sweeping through and through it, with wings extended, and their scissor-like tails widely opened. Their flight was not at all rapid, but steady and powerful, no movement of the wings being perceptible. Our intrusion upon their feeding-ground did not cause them the slightest alarm; not even when my companion's delight at the novelty of the sight we were witnessing began to manifest itself in hints and signs, which I strove in vain to quell, did they seem to take the slightest notice of us.—*Robert Owen, in 'Ibis,' ii. 241*.

Occurrence of the Nest of the Redwing (Turdus iliacus) in North Wales.—About the middle of May, 1855, I was so fortunate as to discover a redwing's nest in a garden at Maintwrog, North Wales. It was placed in the heart of a large bay tree, at about eight feet from the ground, and was composed outwardly of moss, coarse roots, twigs, dead weeds, and a few shreds of old muslin; the lining consisted of fine grass, spread upon a thick, smooth layer of mud. It contained four eggs, very much resembling those of a blackbird, but rather smaller, of a pale greenish blue colour, minutely speckled with two shades of orange-brown and reddish gray. In form and construction the nest was somewhat peculiar, being far neater than that of a blackbird, though much heavier and clumsier than that of a song thrush. I repeatedly saw the bird upon the

eggs, and so also did several of my friends, so that there can be no doubt as to its species. I sent one of the eggs to the late Mr. Yarrell, who expressed much delight at the acquisition of a British specimen.—*Henry L. Saxby; Balta Sound, Shetland.*

Thrush Singing by Moonlight.—On Friday night, the 22nd of February, at ten minutes before ten, I was surprised to hear a thrush in full song. It was quite calm, after two days of tremendous tempest,—the moon had just shone out in splendour, after being obscured by dark clouds; whether this sweet bird had mistaken this sudden light for the early dawn of day no one can tell, but in the whole course of my life I never met with an instance before so late at night and in winter. At midsummer, and at full moon, I have heard the blackcap and cuckoo and several minor songsters; but even at such a time I never heard a thrush sing after ten o'clock.—*H. W. Newman; Cheltenham.*

Blackbirds Singing in the Night.—A few days after that unusually severe hurricane which visited this and other parts of England, at the end of last month, a very unusual phenomenon in Natural History was observed here, which perhaps may interest some of the readers of the 'Zoologist,' and admit of a satisfactory explanation. I happened to be up rather late at night, and heard a blackbird singing as joyously and vigorously as if in broad daylight. This was between twelve and one o'clock in the morning. The night was moonlight and calm, with light fleecy clouds. The same fact was mentioned to me by the village policeman, who, when on his beat that night, was, as he told me, astonished to hear so many birds singing in all directions. With the exception of nightingales and a few other birds, this is not usual even in the summer at night, but during the month of February seems to be a very extraordinary occurrence.—*P. B. Brodie; Vicarage, Rowington, near Warwick, March 12, 1861.*

Dun Variety of the Robin (Sylvia rubecula).—The colouring of this singular variety is an uniform light dun, which pervades its entire plumage, save the breast and throat, which is red, many shades lighter than in an ordinary specimen; tarsus and toes lightish brown; irides light hazel. The bird I describe was shot by Mr. J. Hamilton, of Minard Castle, Argyleshire, near a small mountain stream. In a letter to me that gentleman states that the poor little bird had not a moment's peace from the incessant worrying of numerous sparrows, and of birds of its own species. This quarrelsome exhibition was undoubtedly caused by Master Bobby appearing in an uncommon livery, hence he was not known, or if so not acknowledged, as one of the family. Mr. Hamilton also informs me that a second variety, exactly similar to the one now described, was shot about a week prior to this instance. Surely Minard must be rich in varieties, from the fact that no less than three have been shot in an exceeding short space of time.—*S. P. Saville, Dover House, Union Road, Cambridge.*

Singular Variety of the Chaffinch (Fringilla cœlebs).—This is the second occurrence of one of these prettily pied chaffinches having come under my notice; the first example has been described by me in one of the former numbers of the 'Zoologist,' the second I would wish to describe as truthfully as possible; its pied markings are as follows. Head and neck pure white. Back pied with white light buff, and interspersed here and there with a bright lemon-coloured feather. Rump bright lemon-colour. Fore part of breast and belly light salmon, each feather having its edges white. Vent lighter. Tail interspersed more or less with white feathers. Wings same as tail. Legs light brown. Irides light hazel. Its rump feathers are differently marked to those in the first example, which were green (ordinary), those of the latter being bright

lemon-yellow. From the unusually bright yellow feathers upon its rump and various other parts of its plumage, I was at first rather inclined to the idea that it was a hybrid between the yellow bunting and chaffinch, but I have now decided it is no other than a pied chaffinch, after minute and careful dissection. This handsome variety has been kindly sent to me for identity by Mr. Hamilton, on whose estate it was shot by the gamekeeper, on the 29th of December, 1860. The bird now graces the extensive collection of the above gentleman, to whom my very best thanks are due.—*S. P. Saville*; February 12, 1861.

Varieties of the Bullfinch.—That black or nearly black bullfinches do now and then appear is a fact perhaps well known to ornithologists; I of course do not allude to those kept in confinement and fed on hemp seed, but rather to such as have the pleasure of enjoying the freedom of Nature. I have one myself that was killed some years since in the park of Duff House, which, with the exception of a pinkish feather here and there, is altogether of a jet-black I may say. Another was trapped also near here, by a gardener, last summer. This bird was likewise wholly black, except that it had three white feathers in one wing, one in the other, and two in the tail; but white ones, at least so far as I am aware, are of rarer occurrence; still something of the kind is to be met with here. I am now preserving one for Major Duff, M.P. for Banffshire, which was shot a few days ago in a plantation on his estate of Drummur, by one of his keepers. The breast and a portion of the head are slightly tinged with a beautiful yet delicate pink. The bill, feet and legs are of a bright or orange-yellow, otherwise it is of a pure white; in fact, it may be said to vie almost with the snow in whiteness. Altogether it is one of the most delicate-looking varieties of any species I have ever seen, being so white and pure.—*Thomas Edward*; Banff, February 28, 1861.

Extraordinary Multiformation in the Rook's Beak.—The bird from which this drawing is taken is an exact counterpart and presents one of the most peculiar features of multiformation I ever saw, the upper and lower mandibles being particularly elongated. One feature in the beak is, I think, worthy of remark, *i. e.*, the fact of the utter impossibility of the bird having the power of dividing its beak. It must of necessity have taken its food—taking for granted it could not subsist upon atmospheric air—entirely holding its head on one side, so as to be able to nibble any suitable nutriment which by chance came in the way. From all external appearances the bird presented one of age. The greater quills especially appeared as though they had not been shed, being of a dirty rust-colour, as is more or less the entire plumage. Beak minus the naked space at base, but having the hairy-like feathers peculiar to a young bird. The last rare fact verifies the idea that the constant



probing of the rook's beak in the earth in search of its food (worms, &c.), causes bareness upon the beaks of this species.—*S. P. Saville ; Dover House, Union Road, Cambridge.*

Late Stay of Swallows.—In the January number of the 'Zoologist' (Zool. 7315) Captain Hadfield has an interesting statement respecting the late stay of swallows in the South of England ; I, however, cannot coincide with him when he says he thinks they would not suffer much, even should they spend a whole winter with us. I remember quite well on November 28, 1846, seeing several on the wing here, one of which I shot, and on close examination it was in a most emaciated condition, and I think could not have lived much longer. This is the latest date I ever saw or heard of swallows being seen in this neighbourhood. I saw them very near the spot where I shot a fine specimen of the great sedge warbler, and I believe the only one that has ever been seen in England. I shot it on May 28, 1847.—*Thomas Robson ; Swalwell Iron Works, near Gateshead-on-Tyne, February 13, 1861.*

Migration and Torpidity of Swallows.—It is with some hesitation that I venture to reply to Mr. Gostling's queries (Zool. 7382), on those somewhat vexed points, for "men convinced against their will are of the same opinion still." *First.* "Has it been noticed in previous years that swallows and martins remain in the Isle of Wight much beyond the average period of their departure from our coasts, or is this year an exceptional one? I observed them at Ventnor and its immediate neighbourhood every day, up to the 5th of this month" (November). Frequently, and recorded in the 'Zoologist,' for instance, this season martins were seen as late as the beginning of December. *Secondly.* "Can it be that there is, after all, some truth in the hybernating theory, and that the nooks and crevices of the rocks and cliffs, at a point of our coast so far south as Ventnor, afford them a winter shelter?" Being a native of the place, and having—as boy and man—resided in the Undercliff for upwards of thirty years, I think it probable that it must have fallen under my notice, had swallows taken up their winter quarters here. When a boy, there was scarcely a fissure, hole or corner that I had not peered into, when netting and shooting rabbits; and there having, within my recollection, been numerous slippings and founderings both of sea and land cliffs, swallows must have been discovered did they winter here, as suggested by Mr. Gostling. *Thirdly.* "Is it not reasonable to suppose a swallow may become torpid, and sleep away the cold months, as we know the dormouse does?" I think not, seeing that none have been discovered in a torpid state that I am aware of, though many of the old authors, even down to White and Pennant, have entertained the idea; the latter, however, records the opinion of the celebrated anatomist, John Hunter, saying: That he had dissected many swallows, but found nothing in them different from other birds as to the organs of respiration. That all those animals which he had dissected of the class that sleep during winter, such as lizards, frogs, &c., had a very different conformation as to those organs. That all these animals, he believes, do breathe in their torpid state. And Montagu says, "Mr. Bewick relates an excellent account of the experiments of a Mr. Pearson on swallows, with a view to obtain facts with respect to the absurd obsolete opinions concerning their winter torpidity." "The result of many years confinement of these birds was, that at no time of the year did they indicate the smallest tendency to torpidity," &c. Montagu, again, in referring to the subject, remarks, "It is somewhat extraordinary that those who have stated such as facts [the torpidity of swallows] do not mention what species of swallow was so found, nor have we been able to find a single person of good authority who ever saw the fact," &c. With regard to the dor-

mouse, I would refer Mr. Gostling to Macgillivray, vol. ii. p. 15, showing that the respiratory organs of quadrupeds are very differently formed from those of birds; for instance, he says, "In the Mammalia a muscular expansion, named the diaphragm, is a principal agent in respiration," &c. "In birds, however, there is no diaphragm, properly so called," &c. "The lungs are comparatively small, and not so expansile as in quadrupeds," &c. I am ready to admit that swallows may have been discovered in cliffs, shafts of mines, hollow trees, or in other situations, early in December, or even towards Christmas; but that the birds so found were not in a torpid but in a dying state. Should any one doubt this, let him by all means endeavour to procure specimens between the 25th of December and the 25th of March, and should they prove to be healthy birds, let the fact be announced in the 'Zoologist,' so that the most sceptical of modern ornithologists may be converted to the faith of his forefathers.—*Henry Hadfield; Ventnor, Isle of Wight, March 4, 1861.*

[I do not perceive the advantage of reviving the "hibernation-of-swallows" hypothesis: we know that a swallow could cross the channel in five minutes; we know that it could remain on the wing as many hours; we know that a swallow cannot exist here during winter, when it cannot obtain food; we also know that it can and does exist in the warmer climate of Africa, where food is abundant. Why do we require any hypothesis for the disappearance of the swallows? that the swallow should thus fly to its natural food seems to be as simple a *sequitur* as that fowls should run when called to the barley that is scattered for them. The larger question, "What impulse directs the swallow to its food, invariably guiding it in the right direction?" is far more worthy the attention of the philosopher.—*Edward Newman.*]

The Jackdaw and the Mouse.—An acquaintance of mine here, a barber, once kept a jackdaw, which, he tells me, was very fond of mice. His shop consisted of two rooms, back and front. The former of these was the jackdaw's abode. Amongst other things in it at the time referred to was an old shovel, with a rend about the middle, lying against the wall. One day my friend observed a mouse on the floor. The jackdaw also eyed it, and instantly made a spring, but, unlike our domestic favourite, fell far short of the mark. Mousie of course ran for it, but soon reappeared. This time, however, the bird seemed not to notice it until within a few feet, when another dart was made, but failed as before. My friend was now obliged to leave the room to wait upon a customer. On his return he saw the mouse, but not the jackdaw. Where was he? Once or twice he thought he saw the bird's white eye peeping from a certain place, but he was not quite sure. Mousie, however, approaching this spot rather closely, put an end to all conjecture; for, sure enough, out came the bird's head through the hole in the shovel, and nailed the "wee timorous beastie!" After parading about in triumph for some time, with the mouse dangling in his bill, he gulped it, to the utter amazement of his master.—*Thomas Edward; Banff, February 19, 1861.*

Young of the Lyre Bird.—In the month of October, 1858, the nest of a lyre bird was found in the densely-wooded ranges near the sources of the river Yarra-Yarra. It contained a bird, which seemed at first to be an old one in a sickly condition, as it did not attempt to escape, but it was soon discovered to be a young bird of very large size as compared with its helplessness. When taken out of the nest it screamed loudly, the note being high, and sounding like "tching-tching." In a short time the mother bird, attracted by the call, arrived, and, notwithstanding the proverbial shyness of the species, flew within a few feet of its young, and tried in vain to deliver it from captivity by flapping her wings, and making various rapid motions in different directions

towards the captor. A shot brought down the poor bird, and with its mother near it the young *Menura* was soon silent and quiet. It was taken away and kept at a "miamia" erected in the midst of the surrounding forest. The following is as correct a description of the bird as I can give you: Its height was sixteen inches; the body was covered with a brown down, but the wings and tail were already furnished with feathers of a dark brown colour. The head was thickly covered with a grayish white down of from one to two inches in length; the eyes were hazel-brown; the beak blackish and soft; the legs nearly as large as those of a full-grown specimen, but it walked most awkwardly with the legs bent inwards. It rose with difficulty, the wings assisting, and when on its legs occasionally ran for a short distance, but often fell, apparently from want of strength to move the large and heavy bones of its legs properly. It constantly endeavoured to approach the camp fire, and it was a matter of some difficulty to keep it from a dangerous proximity to it. Its cry of "tching-tching" was often uttered during the day-time, as if recalling the parent bird, and when this call was answered by its keeper, feigning the note "bullen-bullen," the native name for the lyre bird, and which is an imitation of the old bird's cry, it followed the voice at once, and was easily led away by it. It soon became very tame, and was exceedingly voracious, refusing no kind of food, but standing ready with widely gaping bill awaiting the approaching hand which held the food, consisting principally of worms and the larvæ of ants, commonly called "ants' eggs," but it did not refuse bits of meat, bread, &c. Occasionally it picked up "ants' eggs" from the ground, but was never able to swallow them, the muscles of the neck not having acquired sufficient power to effect the required jerk and throwing back of the head. It rarely, if ever, partook of water. It reposed in a nest made of moss and lined with opossum skin, where it appeared to be quite content; while asleep the head was covered by one of the wings. When called "bullen-bullen" it awoke, looked for several seconds at the disturber, soon put its head under the wing again, and took no notice whatever of other sounds or voices. That the young *Menura* remains for a long time in the nest is proved by the manner in which it disposes of its droppings; our young captive always went backwards before dropping its dung, as if to avoid soiling the nest. It is probable that it leaves the nest in the day-time, when the warmth of the weather invites it so to do, but that during the night it remains in the nest; and if the weather should become cold the mother shelters her young, the nest being large enough to contain both.—*Ludwig Becker, in 'Proceedings of the Zoological Society,' 1860, p. 61.*

Mocking Powers of the Lyre Bird.—The *Menura Alberti* is famous for its most extraordinary mocking capabilities. It is found only on the Brisbane and Tweed rivers and in the neighbourhood of their waters. It inhabits the rushes, and generally chooses a sandy soil for its locality. I never saw more than a pair together, male and female. Each male bird has his walk or boundary, and gives battle if another male encroaches on it. He commences singing some time before the dawn of day, being the earliest of the forest birds in this respect. His song is much varied, as besides his own peculiar note he imitates the cries of all the birds in the bush, such as the laughing jackass (*Dacelo gigas*), and even the mournful howl of the owl, and the thrilling scream of the curlew. When singing and playing about he spreads his tail over his back like a peacock. He scratches and picks at the earth when singing, which he generally does until about an hour after sunrise. He then becomes silent, and remains so until about an hour before sunset, while he again commences, and continues singing and playing about until it is quite dark. This *Menura* feeds entirely upon insects, mostly

small beetles, mingled with a goodly proportion of sand. It has no crop or upper stomach. The male bird is about four years old before he gets his full tail, as I have proved by shooting examples in full feather with the tail in four different stages of development; the two centre curved feathers are the last to make their appearance. It breeds in winter, commencing its nest in May, laying in June, and hatching its young in July. It generally builds on some bare rock, where there is a sufficient shelter for a lodgment, so that no animals or vermin can approach. The nest is constructed of small sticks interwoven with long dry roots and moss, the inside being composed of the skeleton leaf of the parasitical tree-fern, which makes an inside lining, and is very similar to horse-hair. It is completely rain-proof, and has an entrance at the side. The hen lays only one egg, of a very dull colour, looking as if it had been blotched over with ink. The young bird when first hatched is covered with a white down, and remains in the nest about six weeks before it takes its departure. The flesh is not good for food, being of a dark colour, tough and dry. The aboriginal name is "colwin."—*A. A. Leycester, in 'Proceedings of the Zoological Society,' 1860, p. 113.*

Bustards at Kalu-hai.—About fifty miles west of the point of Shan-tung we observe a narrow harbour, formed by a deep bight of the coast, and which ends in a creek running over a plain half grassy and half sand. This is Kala-hai, not marked in the charts. At the entrance we find a fishing party very busy curing cod and skate and soles and sharks. Their boats are hauled up on the sands and their nets spread out to dry, while "all hands" under a shed, half buried in heaps of fish, are cleaning and salting with true Chinese industry. As we follow the course of the creek, we find the view bounded seaward by desolate undulating sand-hills, and landward by green pleasant slopes and villages buried in trees. On the sward between the salt-water lagoon and the sand-hills herds of neat little oxen are grazing placidly. On the sandy mud of the half dry-lagoon *Scopimera globosa*, a little roundabout crab, taken quite by surprise, is seen scuttling into holes or quickly hiding in the soft sand. In muddy parts *Glaucomya* and *Anatina* (bivalve mollusks), buried in the mud, throw up from their siphons little watery jets. On the sand-hills are the bustards (*Otis Houbara*) walking about like turkeys, feeding on the dry fruit of a plant unknown to me, or pausing suddenly in their confident strut, with head on one side and outstretched neck. Their quick eye sees the strangers, and with a short cry they all run towards each other, and rise in a little flock of from ten to twenty.—*Arthur Adams.*

Occurrence of the Little Bustard (Otis tetrax) in Moray.—On the 8th inst. the gardener at Westfield, in the parish of New-Spynie, and about four or five miles north-west of Elgin, discovered a little bustard picking turnip-tops, along with a flock of wood-pigeons. It rose with the pigeons, but flew in a different direction. Its flight was like that of a wild duck, except that it kept its head and neck erect or at right angles to its body. Taking a circular course over a twenty-acre field, and while making off, it fell before the gardener's gun at a long distance. It is now in the hands of a bird-stuffer, and will soon have a place assigned to it in the Elgin Museum, beside the one killed near Montrose in 1833, and noticed by Mr. Yarrell. My friend, Mr. P. P. Sellar, to whom I am indebted for the above particulars, states that a few days after his gardener shot this little bustard another was seen two or three times, frequenting the same grounds and feeding in the turnip fields. It was very shy, and could not be approached within a couple of hundred yards. Within the last few months little bustards have been found in Suffolk, Essex and Norfolk (Zool. 7315 7352 and 7353). On the lengthened sea-board that runs northward from these counties to the Moray Firth, other individuals of

this rare species must have alighted during their migration, and the pages of the 'Zoologist,' to which its editor solicits such notices, will, it is hoped, record that some of them have been seen or shot,—most likely in turnip fields, their favourite place of resort while they visit Britain in the winter season.—*G. Gordon ; Birnie by Elgin, February 27, 1861.*

Pheasant Shooting in Japan.—Nearly opposite Niigata, in Nippon, one of the new ports of Japan very shortly to be opened to Europeans, there is a very beautiful island, with a rocky iron-bound coast certainly, but the interior of which abounds in green trees and wooded hills, which are separated by deep gullies, which in their turn gradually expand into rich alluvial plains, watered by rivulets and parcelled off into productive padi-fields. The name of this little island is Sado, and here it was that we formed one of a party which was bent on the shooting of pheasants. At first our way is by the sea-shore, over great level plains of rock, which seems as if it had once boiled and to have been covered with bubbles of stone, which, having burst, have left circular hollows with raised edges. Here we find plenty of Chitons, a cuttle or so, whelks in abundance, a few queer crabs, but as yet no pheasants. Anon we wander by the weed-grown margin of a rapid shallow stream, which sparkles and eddies and goes on its way rejoicing, forming in its course numerous little waterfalls. By its side runs and flirts up and down the tricky water ouzel, often making a dash into the small shallow rapids. Here also are the mild slender wagtails, yellow, pied and gray. Very impudent rooks perch on every tree, and the noisy jays are flirting violently among the branches of the oaks. But we see no pheasants. We follow the upward course of the mountain-stream, and are gradually shut in by the sides of a very charming valley. Bright yellow Persimmons hang like the golden fruit of the Hesperides on leafless trees; dark spreading yews harbour within their cool shade snug little cottages, and on every side, to the eye's delight, are tapering soft elegant Cryptomerias, mingled with broad-leaved sycamores and the magnificent foliage of oaks and chesnuts. Desirous of procuring some acorns we stoop to gather some under the trees, and our occupation being observed a good-natured Japanese runs into his house and brings out handfuls of a nut very similar in appearance to an acorn, but which we recognise as the kernel of a species of *Taxus* growing around. These we are requested to eat, and amid much merriment at our expense, in making so absurd a mistake, our acorns are treated with pantomimic abhorrence and disgust. The *Taxus* fruit had been boiled in salt and water, and were pretty tolerable, though rather rough to the palate. But the pheasants? Well, leaving me to "moon" about as usual, my impulsive messmate Lieutenant Warren, a sportsman successful as well as enthusiastic, strikes across the country, and very soon sees ten or eleven pheasants feeding together in the open spaces of the scrub. They are by no means shy, never having seen sportsmen before, and are first recognised by the peculiar short crow common to the pheasant family. Their favourite haunt seems to be in the shrubs and high grass on the rising land between the cultivated fields. These pheasants are the rare and lovely Phasianus versicolor or Diard's pheasant, found only in Japan. "It would be difficult," exclaims my friend, elated as was natural, to "describe my sensations when first startled by the metallic splendour of the plumage of this king of pheasants. But," continued he, "if the sportsman wishes to 'make a bag' he must be prepared for a very hard day's work, for the ground is very hilly and irregular." Three brace and a half fell this day to the excellent shooting of Lieutenant Warren. At a dinner given on board, Diard's pheasant formed a conspicuous feature, and the flesh was pronounced quite equal to that of the English pheasant.—*Arthur Adams.*

On the Nidification of Birds of the Family Megapodiidæ—The very peculiar habits of the whole family of the Megapodiidæ, departing widely from those of all other birds, may also, I think, be shown to be almost the necessary results of certain peculiarities of organization. These peculiarities are two,—the size and number of the eggs, and the nature of the food on which these birds subsist. Each egg being so large as to fill up the abdominal cavity, and with difficulty pass the walls of the pelvis, a considerable interval must elapse before the succeeding ones can be matured. The number of eggs which a bird produces each season seems to be about eight, so that an interval of three months elapses between the laying of the first and last egg. Now, supposing the eggs to be hatched in the ordinary way, they must be laid on the ground (for the general structure of the bird renders the construction of an arboreal nest impossible), and must be incessantly watched by the parents during that long interval, or they would be surely destroyed by the large lizards which abound in the same district. It seems probable, however, that the eggs could not retain the vital principle for so long a time, so that the bird would have to sit on them from the commencement and hatch them successively. But the period of incubation is a severe tax upon all birds, even when it is comparatively short and food easily obtained. In this case complete incubation would be most likely impossible, because the particular species of fruits on which these birds subsist would be soon exhausted around any one locality, and both parents and offspring would perish of hunger. If this view is correct, the Megapodiidæ must behave as they do. They must quit their eggs to obtain their own subsistence,—they must bury them to preserve them from wild animals; and each species does this in the manner which slighter modifications of structure render most convenient.—*A. R. Wallace, in 'Ibis,'* ii. 145.

Tame Snipe.—Mr. J. C. Upham, of Starcross, Devon, has a common snipe which is extremely tame and familiar, and answers to the name of Jenny. In December last she was caught by some boys near the warren, and was brought to Mr. Upham in a starving state. She was recovered by forcing her to eat some very minute pieces of raw mutton. Worms having been procured she soon commenced feeding herself, and eventually would follow Mr. Upham round the room for a worm. Her bath is a good-sized pie-dish, her *salle à manger* is an eight-inch flower-pot, and her amusement is in probing a large damp sod of rushes placed for her fresh every day on a good thick piece of brown paper. Three of us went to see her on the 27th of January. On our entering the parlour where she is allowed to run about she evinced no alarm, and presently commenced feeding. The upper mandible of a snipe's bill being a little longer than the under one, it was with some perseverance and some difficulty that she picked up from the carpet a worm which was thrown to her. Except when she is very hungry she generally washes the worms before eating them. The flower-pot is half full of earth and worms; it is placed on its side: the snipe when she feeds probes the earth for a worm; having caught one she carries it to the pie-dish. After carefully washing it she disables the worm by pinching it all over with the tip part of her bill; then she takes it by the middle and throws it back to swallow, in doing which the head of the worm is on one side of the bill and the tail on the other. The head and tail soon disappear, and the worm goes down double, even if it be as thick as a goose-quill. The snipe constantly goes in and out of the pie-dish, and probes at its bottom with her bill. She frequently washes herself, throwing the water over her back, and flapping and splashing it with her wings; after which she comes out of the dish and preens her feathers, spreading her tail like a fan, bending it round

with great flexibility in a curious manner, and keeping it in constant motion. She is very fond of the fire, and stands before it on one leg for hours together. She has on two or three occasions exhibited symptoms of impatience at confinement, by flying against the window: on the last occasion she flew against the ceiling of the room with some violence, and came down much hurt, so that the feathers of one of her wings have been cut. Mr. Upham is getting a place made to collect and store worms; her consumption of them is almost incredulous, for she consumes in twelve hours nearly double her own weight. Three sorts of worms she takes, the dew worm, and two other small red sorts, the names of which are unknown to me; the brandling, the lobb, the gilt-tail, or indeed any worm from a dung-heap, she will not touch. She is also very fond of snails' eggs, very small young snails, woodlice, or small Planorbis, and several other fresh-water shells, eating shell and all; she also picks up gravel like other birds. I watched the bird for more than an hour, and saw her eat more than twenty worms. The pie-dish is a blue one, and, as it was thought to be not quite deep enough for her, a larger one was searched for; but Starcross could not furnish a larger blue dish, so a yellow one was bought, but she would not go near it; it was even banked up with turf, but it would not do, so the old blue pie-dish was brought back to her again. Mr. Upham is keeping a diary, and notes down the habits and peculiarities he observes in his pet snipe. He much fears she will not survive the ensuing summer. I was so much interested that I hope to pay the snipe another visit very soon. — *W. B. Scott; Chudleigh, Devon, February 22, 1861.*

On the Occurrence of the Spoonbill in the County of Cork. — In presenting to the Dub'ln Natural History Society some fine specimens of *Platalea leucorodia*, or white spoonbill, I am aware that I can add nothing new to the accounts already published in the several works on Ornithology; it may, however, be of interest to enter into some details respecting the particular birds in question. For two of the specimens I am indebted to my relative Mr. Richard Quin, of Firgrove, Innishannon, County Cork. The village of Innishannon stands on the left bank of "the pleasant Bandon, crowned with many a wood," which rises from the river to a considerable elevation, facing the rocky hill which, on the opposite side, rises nearly perpendicularly, and clothed with wood. Along both sides of the Bandon there are alluvial flats, which above Innishannon form rich pasturage for cattle in the bends of the river, at one of which, opposite Firgrove, Mr. Quin, in 1846, shot the fine specimen of the Canada goose (*Anser canadensis*) which is in the Museum of the Society. Below Innishannon, either from want of improvement or from being at a lower elevation, they extend to a considerable length and breadth nearly to Kinsale, where the river enters the sea. At very high tides and floods these flats are partially submerged. About three miles down the river from Innishannon lies Shippool Marsh, adjoining Shippool Castle, a very old seat of the Herrick family. Early in December, 1860, while looking for snipe on the Marsh, Mr. James Herrick fell in with a flock of four spoonbills, of which he shot one. Of this I had immediate notice from Mr. Quin, having previously urged him to be on the look-out for rare birds, the river near Kinsale being celebrated for the number of water-fowl and waders that frequent it. I wrote to him, to endeavour to secure it, if it was really a spoonbill, and not the shoveller duck (*Anas clypeata*), which is often so called. The result was that Mr. Herrick most kindly presented it at once. For some days after two were seen, and Mr. Quin was indefatigable in trying to secure them for me, but owing to their wildness it was very difficult to approach them. He succeeded, however, in shooting one (the specimen which I have had set up with ex-

panded wings, to show the peculiar black shafts); the other he wounded, but on account of the extent of slob uncovered by the receding tide it escaped, and has not since been heard of; probably it died, and was carried away by the winter floods, which in the Bandon are very powerful on the fall of the tide, which rises to a considerable height, and pushes its waters as far as Innishannon Bridge, enabling coal vessels to sail up. About the same time another was shot by Mr. Thomas Hungerford, of the Island, Clonakilty, County Cork, which he has also presented. These three birds were immature males, and I presume birds of the second year. What impresses me with this idea is the fact that three other specimens have been sent to Mr. Glennon, of Suffolk Street, to be preserved, all of which were males. They were smaller than the specimen before you, and not so white; they are probably of the same age as the living specimens which may be seen at the Zoological Gardens. On consulting Mr. Yarrell's work, and others relating to the spoonbills, it will be found that considerable differences are apparent between the immature and adult bird, the most remarkable of which is the crest or mane of elongated feathers of the occiput and neck in the adult birds, while in the present specimens there is but a very partial elongation. The colour of these is altogether white, except the shafts of the wing-feathers, but in the adult a band of buff feathers covers the breast, extending upwards. The colour of the eye of the young birds is ashy gray, in the adult it is orange-red; and probably the same takes place in the eyes of other birds that, when mature, are of a bright red or yellow, as in the case of the Egyptian goose, &c. We are told also that there is a cere round the eyes to the base of the beak, which in the immature birds is covered with feathers. Fortunately for our information, these birds all fell into the hands of inquiring observers, and it was thought advisable to examine the contents of the stomachs, to find on what these birds subsisted at a season the most inclement for several years, and on which the birds were in fine condition. In the works that I have been able to consult, the food is set down as small Crustacea, mollusks, spawn of fishes, &c.; but in none except Morris, who says, in addition, they eat grasses and the roots of plants, do I find any mention of what all these birds' stomachs contained, which was vegetable matter, probably some of the marsh grasses. No traces of Crustacea or animal matter were found. Now, looking to the conformation of its beak, armed with a sharp broad nail at the end, I do not see why vegetable substances should not form a portion of their food, as in the case of the duck tribe, the palate and sides of whose beaks are not very dissimilar, and therein perhaps we may find a provision of Nature by which the bird, in the absence of more favourite food, may adapt itself to altered circumstances. In the late Mr. Thompson's work we find the records, up to 1846, of the specimens shot in Ireland. I have heard that Dr. Harvey, of Cork, is aware of one shot in that county in 1859, and another at Westport; another was shot at the mouth of the Boyne about the year 1854, by Reynolds, warrener to Mr. James Brabazon, of Mornington, but unfortunately not preserved. It would seem remarkable that, in the accounts published of the several captures, all the instances are on the sea-board; none in the inland counties, although extensive lakes and marshes abound, the resort of birds feeding similarly. The records of Thompson show that in 1808 one was shot in the County Antrim; two in Donegal, in 1837 and 1838; one in the County Dublin, near Malahide (the specimen in the Society's collection), in November, 1841; one in County Wicklow, in October, 1844; three in County Wexford, in 1836, 1840 and 1844; three in County Waterford, in 1829, 1843 and 1845; two in County Kerry, in 1832 and 1846. To the foregoing list three, shot in

the County Cork, are now added. The question why this should be I leave to those naturalists who have devoted their attention to the migration of birds. Were these birds on their southward flight to more genial climes? How is it to be accounted for that all were males? We learn that the spoonbills' nests only contain four eggs. Can the four alluded to have been all of the same nest, and the three others sent to Mr. Glennon have been also from one nest, as they appear to be nearly identical in plumage? Or do the sexes separate in the winter time again to re-unite when the pairing season arrives? I learn that when these birds were shot the weather was mild, but previously there had been north-easterly gales, and they might have been returning from their breeding-places in the north of Europe. Some years ago I had three of these birds alive, which were at first kept in a small enclosure, and subsequently enlarged on the ponds at Drumcondra Castle, which were wired around. They thrived very well, wading along the edges, feeding on various substances, and, with the waterfowl, on a mixture of bran, potatoes and oats: I do not recollect that anything else was supplied to them. After some time they escaped, but how I cannot tell. One thing I particularly remember—that it was very unpleasant to handle them, from the very disagreeable odour attached to them, and that they were covered with parasites, which ran about on the hands if the birds were laid hold of.—*R. P. Williams*. [Read before the Natural History Society of Dublin, and courteously transmitted to the 'Zoologist' by the President thereof.]

Occurrence of the Little Auk (Uria alle) near Guildford, Surrey.—In February of last year (1860) a youth of this town, who happened to be in one of the deep chalk pits belonging to Sir Henry Austen, perceived a strange bird endeavouring to escape from the pit. The bird, however, not having strength enough, kept falling to the ground, and at last was captured by him. He did not then know the name of the bird, but subsequently ascertained it was the little auk. It would not eat anything that was offered it, and died two days after it was caught. The specimen, which was stuffed, is now in the possession of Mr. J. R. Capron, of this town.—*William Bridger; Guildford*.

Eggs of the Great Auk.—The statement by Mr. Wilmot (Zool. 7386), in reference to my list of the possessors of eggs of the great auk, characterizing it as being an erroneous one, demands explanation on my part. The omission of Mr. Wilmot's name was unintentional; but I imagine that when information referring to any branch of Natural History is sought for through the pages of the 'Zoologist,' a mutual benefit is derived by every admirer of its pages. In the present instance I gave, to the best of my knowledge, a list of the known authentic possessors, which, although slightly inaccurate, cannot be termed, as Mr. Wilmot designates it, an erroneous one. My preliminary remarks were to this effect, that "Should any errors or omissions be detected I should be glad to receive any communication on the subject," in order, as the editor justly remarks, "that a correct list of the real possessors might be arrived at." I think, therefore, there was not the slightest reason, on the part of Mr. Wilmot, to have penned his note in the strain he has thought fit to do. I should have thought that he would have omitted all mention of the unfortunate mistake made by Mr. Hewitson in placing the egg the wrong way on the page, thus giving to the public an intimation of an error of judgment which cannot but detract from the usefulness and value of the work in question. It is exceedingly gratifying to me to state that the numerous letters from different parts of the Continent, elicited by my communication to the 'Zoologist,' have added materially to my stock of information, and afford a

sufficient proof of the utility of my remarks.—*Alfred Roberts ; King Street, Scarborough, March 11, 1861.*

[I must request that any future observations on this subject be confined to simple facts: as a matter of justice, not taste, I admit this note by Mr. Roberts: it does not tend to serve the cause of Natural History: I must also say that I do not consider Mr. Wilmot's expression "misstatement" at all called for by the circumstances of the case.—*Edward Newman.*]

Oil-gland in Birds.—Some months ago I observed several notes in the 'Zoologist' respecting the use of the oil-gland in birds, but at the time was too much occupied to be able to write on the subject. However, the following circumstance, which came under my own observation, previous to the discussion in question, will perhaps be worth publishing, as it may tend to clear up a doubt which would seem to exist in the minds of some ornithologists. I was standing at my window, in a farm-house where I then lodged, watching some barn-door fowls that were perched on a low wall immediately in front, and at a distance of not more than two yards from me. It had been raining during the early part of the morning; but as the sun had just begun to shine they were busy dressing their feathers. During this operation I distinctly saw one of them, which stood with its back towards me, raise the feathers over the oil-gland, and, having taken the point, from which the oil escapes, in his beak *sideways*, so as not to interfere with the extremity of it, press a considerable quantity to the surface; and then, having rubbed the feathers of the throat immediately below the beak on the gland, so as to insure their wiping the oil off, proceed to rub his thus anointed throat on his back and other parts of his plumage, at the same time constantly passing the feathers through his beak. This operation he repeated many times, and had I ever entertained any doubt as to the use of the gland it must have been entirely removed by what I then witnessed.—*H. S. R. Matthews ; Westbourne, Emsworth, Sussex.*

Collected Observations on the Nests and Eggs of British Birds.

By EDWARD NEWMAN.

(Continued from p. 7400.)

REDSTART, *Sylvia phœnicurus.*

Situation. Holes in walls, rocks, trees, barns, stables, &c. "One day having occasion for a flower-pot, not of a very large size, I took one which had been left inverted in a narrow path between two sea-kale beds. On lifting it up I discovered a redstart's nest with five eggs placed on the ground. I carefully replaced the pot over the nest, inclining it a little towards the south, so that when the sun was shining I could just discern the eggs through the hole at the bottom (now, from its inverted position, the top) of the pot. On passing it soon after, I found the hen bird was on the nest; and she succeeded in hatching and bringing up her brood; paying no regard to my looking down upon her as I passed by, if I did not stop."—*Rev. John Atkinson (Zool. 355).*

Materials. Moss, lined with hair and feathers.

Eggs, 5—7. Pale blue-green, unspotted.

STONECHAT, *Sylvia rubicola*.

Situation. On the ground at the bottom of a furze bush.

Materials. Moss and dry grass ; the lining feathers, hair, and sometimes fine grass.

Eggs, 5, 6. Pale creamy blue, with minute red-brown spots at the larger end.

WHINCHAT, *Sylvia rubetra*.

Situation. On the ground on heaths, &c., or very near the ground, concealed with such skill that I have searched for hours without finding it, although certain it was within a short distance of me. The bird is said to make a kind of track or meuse along the grass to its nest, and to enter this meuse at a considerable distance from the nest.

Materials. Moss and grass of two kinds, the coarser on the exterior, the finest employed for the lining.

Eggs, 5, 6. Delicate blue-green, rarely with fine red-brown specks.

WHEATEAR, *Sylvia œnanthe*.

Situation. Always in the chinks of stone walls, or under stones on moors or mountain wilds.

Materials. Moss, dried grass, wool and hair: the wool left on brambles and thickets is always sought by these birds.

Eggs, 5, 6. Pale blue-green, rarely spotted at the larger end.

GRASSHOPPER-WARBLER, *Sylvia locustella*.

Situation. In furze-bushes on commons, generally at the very bottom, and in sedge in the fens.

Materials. Moss, grass, lady's bedstraw ; the lining fine grass.

Eggs, 4—7. Gray tinged with rose-colour, speckled all over with the same colour, but of a deeper shade.

SAVI'S WARBLER, *Sylvia luscinoides*.

Situation. On the ground, in the parish of Milton, between three and four miles from Cambridge.

Materials. The leaves of the common reed, without any other lining.

Eggs, 4, 5. Whitish, nearly covered with minute specks of two colours, pale red and light ash-gray. "These nests were found at Baitsbite, in the parish of Milton, between three and four miles north of Cambridge. The nests, in each instance, were on the ground in a thick tuft of sedge. These are cup-shaped, compactly formed of the

long narrow leaves of the common reed (*Arundo Phragmitis*), wound round and interlaced, but without any other lining. The eggs measure ten lines in length by seven and a half lines in breadth; of a whitish ground-colour, covered nearly all over with minute specks of two colours, one set being of a pale red, the other of light ash-gray; in some of the eggs the pale red spots are more conspicuous, and these resemble the eggs of the grasshopper warbler, but are rather larger; in others the gray specks are predominant, and these resemble the eggs of the Dartford warbler."—*Mr. Bond* (Zool. 1212).

SEDGE WARBLER, *Sylvia Phragmitis*.

Situation. At the foot of low bushes by the sides of ponds and ditches, or in a tuft of grass: in situations exactly similar to those selected by the reed bunting, and not suspended among reeds, as recorded by Mr. Selby and others; in fact it seldom frequents reeds.

Materials. Moss and coarse grass externally, lined with hair and fine dry grass.

Eggs, 5, 6. Pale umber-brown, sometimes slightly streaked with black.

GREAT SEDGE WARBLER, *Sylvia turdoides*.

Situation. In beds of reeds, supported by three or four of the reed-stems.

Materials. Dried leaves and flowering scapes of the reeds.

Eggs, 4, 5. "Pale greenish white, spotted and speckled with ash-gray and reddish brown."—*Yarrell*, i. 301.

REED WREN, *Sylvia arundinacea*.

Situation. In marshy situations suspended over the water, between the stems of reeds, to which it is curiously and beautifully fastened by the dried grasses and reeds, of which it is principally constructed: often in bushes near water.

Materials. Dried leaves, as well as the dried flowering scapes of the reed.

Eggs, 4, 5. White, tinged with green, and blotched with brown and olive-green.

NIGHTINGALE, *Sylvia Philomela*.

Situation. On the ground, especially on banks.

Materials. Dried leaves outside, lined with fine grass.

Eggs, 4—6. Yellow olive-brown, unspotted; occasionally blue.

BLACKCAP, *Sylvia atricapilla*.

Situation. In nettles, brambles, always near the ground, but not

on it. "A pair mostly build in the laurel hedge in my garden, and place the nest six feet from the ground."—*Mr. Doubleday.*

Materials. The dried stems of cleavers, fibrous roots, &c.; very slovenly in structure.

Eggs, 4, 5. Whitish, spotted and blotched with two shades of brown or delicate pale pink, with dark red spots and blotches.

GARDEN WARBLER, *Sylvia hortensis.*

Situation. Among nettles and in bramble-bushes, or traveller's joy when densely matted and near the ground.

Materials. Moss, dried goose-grass, fibrous roots, wool, horse-hair; a loose and slovenly nest.

Eggs, 4, 5. Pale stone-colour, spotted with ash-gray and brown.

WHITETHROAT, *Sylvia cinerea.*

Situation. Among nettles and in bramble-bushes, or in any low and very thick herbage.

Materials. Generally the dead stems of goose-grass and a little hair; the materials are very loosely attached, and the nest appears carelessly made.

Eggs, 4, 5. Greenish white, spotted with gray and brown; the spots much thicker at the larger end, and forming a zone.

LESSER WHITETHROAT, *Sylvia curruca.*

Situation. Among nettles, brambles, &c.

Materials. Stout bents outside; finer ones and horsehair inside.

Eggs, 4, 5. White, inclining to gray, with scattered spots of dark gray and pale umber-brown, chiefly at the larger end.

WOOD WREN, *Sylvia sylvicola.*

Situation. On the ground, among coarse tufts of grass; its shape a depressed sphere.

Materials. Hay, leaves, moss, lined with very fine hay and horsehair.

Eggs, 5, 6. White, covered with purple-red spots, rarely confluent and forming a zone at the largest part.

WILLOW WREN, *Sylvia trochilus.*

Situation. On the ground, generally on the bank bordering roads that have been worn through woods; its shape a depressed sphere, with a lateral opening.

Materials. Moss and grass externally, lined with feathers.

Eggs, 5—7. White, delicately speckled with red, or sometimes unspotted white.

CHIFFCHAFF, *Sylvia rufa*.

Situation. On or near the ground in hedge-banks; nearly spherical or oval, with a lateral opening.

Materials. Dead grass, leaves and moss outside; a profusion of feathers in the interior.

Eggs, 5, 6. White, with a few purple-brown specks.

DARTFORD WARBLER, *Sylvia provincialis*, Temminck.

Situation. Thick furze bushes, about two feet from the ground.

Materials. "The nest is composed of dry vegetable stalks, particularly goose-grass, mixed with the tender dead branches of furze, not sufficiently hardened to become prickly: these are put together in a very loose manner, and intermixed very sparingly with wool. In one of the nests was a single partridge's feather. The lining is equally sparing, for it consists only of a few dry stalks of some fine species of *Carex*, without a single leaf of the plant and only two or three of the panicles. This thin, flimsy structure, which the eye pervades in all parts, much resembles the nest of the whitethroat."—*Col. Montagu, Linn. Trans.* "I possess eight nests of the Dartford warbler: they all agree with Montagu's description, as far as the materials are concerned, but they are much more compact than he describes them, and not at all like the whitethroat's."—*Mr. Bond.*

Eggs, 4—6. "The eggs are also similar to those of *Sylvia cinerea* (the whitethroat), but rather less, weighing only 22 grains; like the eggs of that species they possess a slight tinge of green; they are fully speckled all over with olivaceous-brown and cinereous on a greenish white ground, the markings becoming more dense and forming a zone at the larger end."—*Col. Montagu, Linn. Trans.* "I have about twenty eggs of the Dartford warbler, and they are more like those of the lesser whitethroat."—*Mr. Bond.*

GOLDENCRESTED REGULUS, *Regulus cristatus*.

Situation. Suspended from the horizontal twigs of the spruce fir or yew, rarely of other trees: several instances are recorded of this bird breeding twice in the same nest (see Zool. 871).

Materials. Moss and lichen, lined with feathers; a very beautiful and compact structure. Mr. Selby, as I think erroneously, described this nest as spherical: I should call it a hollow hemisphere; in this not differing from the ordinary form of compact nests.

Eggs, 6, 7. Rosy white or very pale brown, unspotted.

GREAT TITMOUSE, *Parus major*.

Situation. Holes in the trunks of trees, or of walls: on the former Mr. Selby has this observation, "The excavation is made by the bird

itself, which I have seen busily engaged in this task, and have admired the rapidity with which the work advanced." Mr. Hawkins relates (Zool. 3503) a singular instance of this bird building its nest in a drinking-cup.

Materials. Moss, feathers, hair.

Eggs, 6—12. White, spotted with red-brown.

BLUE TITMOUSE, *Parus cæruleus*.

Situation. Holes in trees or walls.

Materials. Moss, feathers, hair.

Eggs, 7—9. White, spotted with red-brown at the larger end.

CRESTED TITMOUSE, *Parus cristatus*.

"At Inverness, on the 23rd June, I was shown some specimens of the crested titmouse, with some unblown eggs, taken a few days before from the pine woods of Strathspey, where they are by no means uncommon. The boy who took the eggs told me they were always to be found in the hole of a tree highish up; he took the female with the nest and five eggs. The eggs are the size of those of the blue titmouse, and like them in colour, with the addition of being more mottled at the larger end."—*Sir William Milner* (Zool. 2017). "I have Scotch specimens in which the spots are larger and brighter than in those of the blue titmouse."—*Mr. Bond*.

COLE TITMOUSE, *Parus ater*.

Situation. In the ground in banks this bird takes possession of the deserted hole of a rat, mole, or perhaps mouse; sometimes, but not so often, in the trunks of a tree. "I once found one on the branch of a fir, close to the bole, very like a longtailed tit's, but much rounder."—*Mr. Bond*.

Materials. Moss, wool, hair.

Eggs, 6—9. White, spotted with red-brown.

MARSH TITMOUSE, *Parus palustris*.

Situation. Holes of trees, especially willows, placing the nest very deep. Mr. Gurney mentions one built in a rat's hole (Zool. 3503). They often build in holes in banks.

Materials. Moss, the down of the ripe catkins of the willow, and the fur of rabbits, if they can procure it.

Eggs, 6—8. White, with red-brown spots, more numerous at the larger end.

LONGTAILED TITMOUSE, *Parus caudatus*.

Situation. Bushes and trees.

Materials. Lichens and wool, lined with feathers. The nest of this strange-looking little bird is totally different from that of any other

species with which it is associated by naturalists; it is one of the most beautiful and interesting structures that the student of birds has ever discovered: its size is remarkably large for the bird, its shape oval, its position perpendicular; the whole structure is strongly and compactly united by the interweaving of wool with the moss and lichens; on one side is a circular hole through which the bird enters, but this is scarcely visible when she is absent, so that I am inclined to believe she partially closes this opening on leaving the nest, for the sake of security. Mr. Selby makes an assertion with respect to this nest that I have never been able to verify. "A small hole," says this distinguished naturalist, "is left on two opposite sides of the nest, not only for ingress and egress, but also to prevent the bird, during incubation, from being incommoded by its long tail, which then projects through one of the orifices." Mr. Bond tells me he does not think there are ever two holes.

Eggs, 7—9. White, delicately tinged with rose-colour until blown, when they lose this hue; there are some very minute red-brown specks about the larger end.

BEARDED TITMOUSE, *Calomophilus biarmicus*.

Situation. Large beds of reeds in Hickling and Hornsey Broads, in Norfolk.

Materials. "The nest is composed, on the outside, of dead leaves of the reed and sedge, intermixed with a few pieces of grass, and lined with the top of the reed. It is generally placed in a tuft of coarse grass or rushes near the ground, on the margin of the dykes, in the fen; sometimes fixed among the reeds that are broken down, but never suspended between the stems."—*Mr. Hoy*.

Eggs, 4—6. White, with pale red-brown lines.

This bird appears to me to have no relationship to the tits, with which it is always associated: in structure, nest and eggs it more nearly resembles the buntings.

PIED WAGTAIL, *Motacilla Yarrellii*.

Situation. Holes in stone walls, heaps of stones by road-sides, quarries, roofs of porticos, pollard willows at the top of the trunk. Some remarkable situations for the nests of wagtails are recorded in the 'Zoologist': I will cite one. "Under a switch of the Ayrshire Railway, at the Lochwinnoch Station, a pied wagtail built her nest and sat on five eggs, although there was scarcely an hour in the day without trains passing over it, and the whole of the engine and carriages within two or three inches of the nest."—*Zool.* 726.

Materials. Moss, fibrous roots, grasses, wool, horsehair.

Eggs, 4—6. Gray, speckled with light umber-brown.

GRAY WAGTAIL, *Motacilla boarula*.

Situation. Shelves of rocks, under stones in quarries and on banks.

Materials. Moss, bents and horsehair.

Eggs, 5, 6. Gray, blotched with ochre-gray.

RAY'S WAGTAIL, *Motacilla campestris*. This bird is better known among collectors by the names of "Yellow Wagtail" and "Motacilla flava," both which names are considered properly to belong to another European species which occasionally visits this country, but I think does not breed here.

Situation. On the ground.

Materials. Hay, bents, fibrous roots, lined with horsehair and cow's hair.

Eggs, 4, 5. Pale umber-brown, with darker spots.

TREE PIPIT, *Anthus arboreus*. This species is confounded with the following, under the name of "Titlark": the name should be confined to the Meadow Pipit.

Situation. On the ground, under shelter of a loose turf or tuft of grass.

Materials. Moss, fibrous roots, wool, grasses, lined with finer grasses and hair.

Eggs, 4—6. Probably more variable than those of any other British bird; sometimes pale brown, thickly dotted with deep brown spots, mostly forming a zone at the larger end; sometimes deep brick-red colour, thickly sprinkled with dots of a deeper shade; at other times pale or reddish, marked with spots and streaks, like the eggs of the buntings; others closely resemble the red variety of the egg of the blackcap, and others again are very similar to the egg of the house sparrow.

MEADOW PIPIT, *Anthus pratensis*.

Situation. On the ground, protected, if possible, by a loose turf or tuft of grass.

Materials. Bents and the seed-stalk of Cardamine pratensis, lined with very slender bents or horsehair.

Eggs, 5, 6. Pale brown, freckled with spots of a deeper colour: vary but little.

ROCK PIPIT, *Anthus obscurus*.

Situation. Crevices or ledges of sea-cliffs.

Materials. Coarse bents and sea-weed on the outside; finer ones and sometimes horsehair for the lining.

Eggs, 4, 5. Gray, spotted with red-brown; the spots crowded at the larger end, like those of the meadow pipit.

SKYLARK, *Alauda arvensis*.

Situation. On the ground amidst corn and standing grass.

Materials. The dried stems of a variety of herbaceous plants outside; lined with very fine grasses.

Eggs, 4, 5. Dirty white, tinged with green, and spotted with umber-brown, generally forming a zone at the larger end.

WOOD LARK, *Alauda arborea*.

Situation. On the ground, under a tuft of grass or any low plant.

Materials. Grasses and bents, the coarser ones outside, the finer used for lining.

Eggs, 4, 5. White, thickly speckled with reddish brown; rarely zoned at the larger end.

SHORE LARK, *Alauda alpestris*.

The Hon. T. L. Powys mentions (Zool. 3707) the very remarkable fact of the shore lark breeding in Devonshire. "On the 12th of July, 1851, my friend, Mr. W. W. Buller, found a nest of the shore lark near Exmouth, South Devon, among some bent grass close to the sea, and containing four eggs. The eggs were very much like those of the wood lark. The hen bird was caught on the nest, and is in my friend's possession."

COMMON BUNTING, *Emberiza miliaria*.

Situation. Among coarse grass, near to or on the ground.

Materials. Straw, coarse hay, outside; lined with fibrous roots and sometimes with horsehair.

Eggs, 4—6. Gray, tinged with yellow, with red-brown and ash-coloured spots and streaks.

BLACKHEADED BUNTING, *Emberiza Schoeniclus*.

Situation. On the ground, under a tussock of *Carex*, *Aira cæspitosa*, or some coarser grass, always in moist swampy localities.

Materials. Moss, dried grass, lined with fine grass and horsehair.

Eggs, 4, 5. Gray, with a slightly rosy tinge, spotted, streaked and veined with purple-brown. "The eggs much resemble those of a chaffinch."—*Col. Montagu*.

YELLOW HAMMER, *Emberiza citrinella*.

Situation. On or near the ground, commonly under shelter of overhanging grasses. I have on three occasions found the nest of this bird in cart-ruts seldom used; in two instances the parent had perished by the passage of a waggon laden with hay.

Materials. The decayed or dried leaves of grass form the exterior of the nest, then follows a layer of finer grasses, and the whole is lined with horsehair.

Eggs, 3—6. Dingy white, tinged with purple, streaked and veined with purple-brown, each streak or vein generally terminating in a spot of the same colour.

CIRL BUNTING, *Emberiza Cirrus*.

Situation. "It generally builds in furze or some low bush."—*Col. Montagu*.

Materials. "The nest is composed of dried stalks, roots and a little moss, and lined with long hair and fibrous roots."—*Col. Montagu*.

Eggs, 4, 5. "The eggs are four or five in number, cinereous-white, with irregular long and short curved dusky lines, terminating frequently with a spot at one end; size rather inferior to those of the yellow hammer."—*Col. Montagu*. "I have taken several nests in the Isle of Wight."—*Mr. Bond*.

CHAFFINCH, *Fringilla cœlebs*.

Situation. Generally in forks of smaller branches of lichen-covered apple-trees, but also in other trees; and I have found the chaffinch's nest in the ivy which sometimes clothes the trunks of trees.

Materials. Moss, lichens and wool, interwoven into the most compact mass, and forming a beautiful and symmetrical object, always assimilating in colour to the site the bird has chosen; the lining is feathers and hair.

Eggs, 4, 5. Gray, tinged with blue and pink, and streaked and spotted with purple-red; sometimes all pale blue.

TREE SPARROW, *Fringilla montana*.

Situation. In the holes of pollard and other trees that have gone to decay; rarely in the thatch of old barns, &c.

Materials. Hay, straw, lined with feathers, the flowering tops of reeds, &c.; the top domed over (*Zool.* 1875).

Eggs, 4, 5. Gray, thickly spotted with darker gray, or umber-brown; frequently white, with gray spots or blotches.

HOUSE SPARROW, *Fringilla domestica*.

Situation. Generally under the eaves of houses, barns or stables; sometimes in the mud-built habitation of the martin, but not uncommonly in trees in exposed situations and quite apart from buildings.

Materials. Straw and hay, lined with feathers.

Eggs 5, 6. Gray, almost white, but thickly sprinkled and spotted with darker gray or black. "Of a very long, oval form."—*Mr. Selby*.

GREENFINCH, *Fringilla chloris*.

Situation. In thick hedges, ivy and other evergreens.

Materials. Moss and wool, lined with hair and feathers. *Mr.*

Gurney writes (Zool. 3576), "In a bushy plant of heath, growing in a garden near Norwich, were found two nests of the common greenfinch, which not only were completely interwoven at the adjoining sides, but were built on one common platform, a foundation of fibrous roots and moss. Both nests were complete, except that one of them was deficient in interior lining. When found I understand there was one egg in each."

Eggs, 4, 5. White, with a tinge of blue, speckled at the larger end with light orange-brown.

EDWARD NEWMAN.

(To be continued.)

Occurrence of Lythria purpuraria in Britain. — I have just been over to Burghfield, and, after a good search through Mr. Wailes's magnificent library, am able to inform you of the capture of a *Geometra* new to (or rather renewed to) the British list, viz., *Lythria purpuraria*, *Hüb.*: two specimens, males, of this conspicuous insect were beaten out of broom, on the 18th of June, "not far from the city of Perth," by Mr. D. P. Morrison, of Pelton, near here. One is at present in my possession; the other graces the cabinet of a friend of Mr. Morrison's. I see Stephens records it, on the strength of a single specimen, in his genus *Aspilates*: it is figured in *Hübner* (*Geo.* 38), *Freyer* (*Geo.* 60), and others: the former is considered the best by *Guenée*. — *V. R. Perkins*; *Newcastle-on-Tyne*, February 23, 1861.

Close of the Labours of a Colony of Hornets. — The following remarks have reference to the colony of *Vespa crabro*, some particulars relating to which were given in my paper on "*Vespidæ*" (*Zool.* 7261). The nest, with the insects belonging to it, was, as there stated, removed on the 7th of September from its original situation in the head of a felled tree to the interior of a glazed box, and conveyed to a room some two miles distant from the place of capture, where the labours of the colony were resumed and carried on during the remainder of the season. The insects continued to work with great perseverance till the 9th of November, although their numbers had been gradually falling off for some few weeks previously. On the above day I captured eighteen workers and a couple of young queens, for the purpose of supplying Mr. Westwood with specimens, that gentleman having expressed a wish for some from which to prepare the sting and other parts, in illustration of some remarks upon their organization he was about to submit to the members of the Ashmolean Society at one of their meetings. The mode of capture was as follows. A bit of rag was bound round one end of a piece of wire and introduced through an aperture in the box; this was brought close to the individual marked out for capture, who thereupon immediately seized the rag with its mandibles, and to which a hearty shake or two, or a squeeze against the side or bottom of the box, by way of provocation, caused the creature to adhere so firmly, and with so determined a grasp, that there was no danger of its quitting its hold on being withdrawn from the box, nor while it was being passed from thence and placed inside the mouth of a bottle, nor was it without extreme difficulty it could at last be separated from its supposed enemy. This applies only to workers; in the capture of young queens

and males different means must be employed, and some degree of wariness and caution observed, since the former, though possessing ample means of defence, and although in the spring they will upon occasion fight desperately with each other, will nevertheless at other times be observed to decline engaging in a contest in which they might chance to get the worst of it; having a constant eye to self-preservation they act as though fully agreeing with Sir John Falstaff, that "the better part of valour is—discretion," while the latter, being totally unprovided with the means of defence, seem to be aware that their only chance of safety lies in avoiding danger in whatever shape it may present itself; they therefore never voluntarily expose themselves to it, but may be observed upon all occasions to retreat therefrom with as much agility as—from their somewhat sluggish nature—they are capable of exercising. The capture of these individuals had the immediate effect of putting a complete stop to the work of the nest, and of breaking up the community. A few solitary workers were to be seen hanging listlessly about for a day or two, with here and there a young queen, after which they all disappeared. On removing a portion of the covering, for the purpose of observing the state of the combs, I was surprised to find that the old queen—the foundress of the colony—was still in the nest, and that with the exception of larvæ, &c., she was the sole occupant, the worn appearance of her body, the pubescence with which it was once adorned having been completely rubbed off, together with the tattered state of her wings—too tattered to be of further use to her—were marks sufficient to prevent any mistake being made in her identity. Although so late in the season, she was found, on being opened after death produced by chloroform, to contain a considerable number of eggs: this was probably owing to the late period in the summer at which she began to lay, since, as stated in my former paper, only about twenty young hornets had made their appearance at the beginning of August. The nest contained five combs on its completion, or rather when the work of enlarging it had ceased, for nests formed by the social *Vespidæ* are, in point of fact, never completed. The building is invariably in a progressive state till the strength of the workers fails and they drop off in the midst of their work, leaving numbers of incomplete cells and unfinished portions of the covering in which the combs are enclosed. The upper comb consisted entirely of the cells of workers; the second of males, and the third, fourth and fifth of females. All the cells, both of workers and males, were empty; not a single egg, larva or pupa being found in either of them. The female cells contained about a dozen eggs and near two hundred larvæ, one of which, and only one, had spun itself up. The remaining cells were empty, the larvæ they once contained having passed into the perfect state, except a few which had fallen out or had been dragged out by the workers. None of the cells contained more than one egg or one larva each, and none of the workers whose bodies were examined were found to contain eggs, which two circumstances combined rather lead to the inference, though they are by no means sufficient to prove, that among the social *Vespidæ* it is only in nests that have been deprived of the queen we find cells crowded with eggs or larvæ, and that wherever such is observed to be the case those eggs and larvæ are the produce of workers, who, but for the occurrence of the casualty just alluded to, would have remained infertile. The covering with which the insects contented themselves during the greater part of the season was basin-shaped, and thin in substance, but as the weather became more severe it was gradually made thicker, and the opening as gradually contracted, so that it appeared to be the ultimate design of the workers to close it up so far as only to leave, like the other species of social *Vespidæ*, an aperture sufficiently large for the purpose of entrance and exit.

The structure was one of great beauty, both with reference to shape and also in the distribution of the colours, which were exceedingly rich and varied. From the circumstance of the nest on its first removal being found to contain a specimen of *Velleius dilatatus* in the perfect state, I had great hopes of being able to obtain larvæ of that insect at the close of the season. In this, however, I was disappointed, for upon a close examination neither larvæ nor any trace of the parasite could be discovered; it would therefore appear that the creature at the period of its capture had not found time to deposit its eggs. Among the refuse which accumulated underneath the nest, two or more species of Dipterous insects found means to deposit their eggs, the larvæ produced therefrom feeding upon the offal which chanced to fall from the combs. A number of these larvæ were exhibited at the February meeting of the Entomological Society, by Mr. Walker, on the part of Mr. F. Smith of the British Museum, to whom I sent them, when some were pronounced to be those of *Anthomyia canicularis*, while it was considered doubtful what the others might prove to be. It was amusing to observe the cool way in which numbers of the common house-fly, blue-bottles and other species would enter the box and take their places round the dish containing the sweets upon which the hornets were regaling themselves, feeding with apparent unconcern close beside the latter-named insects. Occasionally an unlucky individual was made to pay dear for its temerity, but by far the greater number dexterously contrived from day to day to evade all attempts on the part of the hornets to catch them.—*S. Stone; Brighthampton, near Witney.*

Inquiry respecting the Name of a Larva.—I should be much obliged if you would inform me of the name of the grubs of which the following is a description:—They were found by the woodman on cutting down a rotten elm tree in a gentleman's garden, December 11th. There were three in number; they were whitish, verging to a bluish purple towards the tail: the largest was about three inches in length and $1\frac{3}{4}$ inch in circumference; it had small brown spiracles, one for every joint in its body, of which there were fourteen; it had six brown and serrated legs behind its head, which was brown and hard, having immense, strong and deeply serrated mandibles, and correspondingly large maxillæ, very small black eyes, and antennæ with five joints. At first it might be mistaken for a goat-moth caterpillar, but the colour is different; the jaws of the latter are much smaller; and it had none of those sucker legs which the goat-moth caterpillar possesses.—*H. G. Percy; Albury Park, Sur-March 26, 1861.*

[Certainly the larvæ of the common stag beetle (*Lucanus Cervus*).—*E. Newman.*]

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

March 4, 1861.—*J. W. DOUGLAS, Esq.,* President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘On some Oceanic Entomostraca collected by Captain Toynebee,’ by *John Lubbock, Esq., F.R.S., F.L.S.*; presented by the Author. ‘The Journal of the

Royal Agricultural Society of England,' Vol. xxi. Part 2; by the Society. 'The Journal of the Society of Arts' for February; by the Society. 'The Athenæum' for February; by the Editor. The 'Zoologist' for March; by the Editor. 'The Entomologist's Weekly Intelligencer,' Nos. 227 to 230 inclusive; by H. T. Stainton, Esq. 'Stettiner Entomologische Zeitung,' Vol. xxii. Nos. 1—3; by the Entomological Society of Stettin.

Elections.

George Sharp Saunders, Esq., of Hill Field, Reigate, was elected a Member of the Society; and Alfred Haward, Esq., of Gloucester Road, Croydon, was elected a Subscriber to the Society.

Exhibitions.

Mr. Stainton exhibited two beautiful specimens of *Xylina conformis*, taken near Cardiff, on ivy-blossoms, in October, 1859. The species had not hitherto been captured in Britain.

Dr. Wallace exhibited fine dark varieties of *Hemerophila abruptaria*, taken near London; and a *Lasiocampa* bred from the larva found in the Isle of Wight, which he considered closely resembled the species or variety from the North of England, called *Callunæ*.

Mr. Mitford exhibited a beautiful brown variety of *Biston prodromarius*, and a produced hybrid from *Phigalia pilosaria* and *Nyssia hispidaria*, respecting which he furnished the following notes:—

"On the 5th of March, 1859, I enclosed a female of *Nyssia hispidaria*, which had recently emerged from the pupa, in a gauze-covered chip-box, and also introduced a male of *Phigalia pilosaria*. They copulated, and on the 7th of that month the female deposited her eggs, which hatched the first week in April, and the larvæ assumed the pupa state about a month afterwards. The following March three perfect and three crippled males and one female made their appearance. In size the males resemble *N. hispidaria*, but in colour have the lighter and greener tint and transparency of wing of *P. pilosaria*; the legs and antennæ of the female also are annulated as in the females of the latter species. I should add that but for an accident, which destroyed the greater part of my pupæ, I should probably have bred forty or fifty more."

Mr. Mitford also exhibited the following species of *Psyche*, with notes on their economy:—

"*P. fusca*. Larva of this species abundant in the neighbourhood of Hampstead; it feeds early and late in the season, chiefly on bramble; in the summer months, on various trees and plants, more particularly buckthorn, oak and mountain ash. The larvæ are hatched in August, and the moths appear the following June twelvemonths; thus they are two years in arriving at the perfect state. The female pupa-cases are found spun up on leaves in an upright position; that of the male is generally pendant from branches or main stems.

"*P. radiella*. The perfect insect frequents moist places on Hampstead Heath, in June. I have never found the larva-cases.

"*P. salicolella*. The larva-cases of this species were discovered by Mr. Tompkins on buckthorn, and afterwards by myself on birch, at Hampstead: they are a *fac-simile* of a small *P. fusca* case.

"The females of these three species remain within the larva-case.

"*P. intermediella*. Found on stems of fir-trees at Black Park, in abundance, in June.

"*P. roboricolella*. The larva-cases are found on various trees at Hampstead.

"*P.* —? Apparently a very distinct species, allied to *P. roboricolella*, but the wings much more rounded, as in *P. radiella*."

Mr. Mitford likewise exhibited a fine specimen of *Acrolepia marcidella*, taken in his garden at Hampstead.

Mr. Bond observed that the two or three examples of this species hitherto taken in this country were much wasted.

Dr. Knaggs announced that the *Noctua* exhibited and described by him at the Meeting of the Society on the 1st of October last as *Nonagria? Bondii*, had been pronounced by M. Guenée to be a species unknown to him.

Mr. Waterhouse exhibited three species of *Scymnus*, viz., *S. discoideus*, and two others which he thought might probably be included by authors among the varieties of that species, but which have different habits and present distinguishing peculiarities. With regard to *S. discoideus*, he observed that all, or almost all, authors stated that the insect was found on, or in the immediate neighbourhood of, fir trees: he had examined a large number of specimens having this habitat, but he did not find that amount of variation in colour which had been attributed to the species; on the contrary, a large number of specimens collected by himself and Dr. Power, from fir trees, presented no marked varieties: they could all be comprised in the following description:—

Oval (slightly oblong), black; elytra thickly and rather finely punctured, the punctures of unequal size; fulvous-red, with the suture narrowly edged with dusky, and sometimes likewise the base of the elytra, as well as the outer margin on the basal half; antennæ, palpi and legs more or less dusky (never entirely pale); thorax with the sides very generally rufescent, especially towards and at the anterior angles. Body beneath rather strongly but by no means thickly punctured; the chest with a distinct longitudinal groove.

The dark edging to the suture and other parts of the elytra is very commonly ill-defined, and by no means distinct. *S. atriceps* of Stephens is founded upon an immature specimen of this species. The other two insects were found in marshy situations in localities far remote from fir trees. The first of these Mr. Waterhouse distinguished from *S. discoideus* by its somewhat smaller size; less ample, and posteriorly somewhat acuminate elytra; the more dense and fine puncturing of the under parts; the constantly uniform testaceous colour of the legs, the shorter and more inflated form of the femora; the excessively indistinct or obsolete pectoral groove; and, lastly, by the colouring. Here the black on the elytra usually covers as much surface as the red; in most instances it completely margins each elytron, is broad at the base of the elytra, and on the suture it forms a band which is very broad anteriorly, and gradually contracted in width towards the apex of the elytra, but very commonly it is more or less expanded for a short distance near the middle of the suture. To this insect Mr. Waterhouse applied the name *S. Mulsanti*: it is the *S. limbatus* of Stephens's collection, but not of his description. Mr. Waterhouse stated that he had examined upwards of thirty specimens found at Southend, Deal, Holmbush, &c.

The third species is considerably smaller than *S. discoideus*, is black, with deep red elytra, and these are narrowly margined externally, and rather broadly margined at the apex, with black; along the suture is a broad (at times very broad) black band, which is pretty nearly of uniform width: it is, however, more particularly distinguished by its short convex form (the elytra being very obtusely rounded behind), and the punctuation of the elytra being stronger and more distinct, the punctures not varying in size, being less dense, and the interstices being even, not rugulose. Eleven specimens (mostly from the Hammersmith Marshes and Hornsey Fen) furnish the above characters: in all, the legs are black, and the antennæ and palpi dusky. This is the *Scymnus limbatus* of Kirby's MSS. and collection, and of Stephens's 'Illustrations.'

Mr. Waterhouse communicated detailed descriptions of these three species to the Meeting.

Mr. Waterhouse also exhibited three species of *Bryaxis*; two at least were hitherto unrecorded as British; one of the three is probably the *B. assimilis* of Curtis.

Bryaxis Helferi, Schmidt, &c., Pselaph. Faun. Pragen, p. 33.

———, Aubé, Révision de la Famille des Pselaphiens, in the Annales de la Soc. Ent. de France, 2me sér. ii. p. 109.

——— *pulchella*, Schaum, in Germar's Zeitschrift für die Entomologie, iv. 192.

In size and colouring this species nearly resembles *Bryaxis impressa* of Denny, Erichs., Aubé, &c., but is readily distinguished by the comparatively large size of the central fovea on the back of the thorax, this being nearly as large as the lateral foveæ, whilst in *B. impressa* it is very small, as in *B. Juncorum*; moreover, the male sex of the present insect has the anterior trochanters armed with a spine, and the first abdominal segment has a small curved groove at the apex, enclosing a small, slightly raised area. The middle tibia has a distinct spine at the apex in the same sex. Usually the red of the elytra is darker than in *B. impressa*.

On the Continent this species is said to be found in the neighbourhood of salt or brackish water, and such was the case with most of his specimens, these being taken at Sheppey, Southend and Gravesend, but it does not confine itself to such situations, since Mr. W. found a specimen at Hawkhurst, in Kent, and a second in the Crystal Palace.

B. Lefebvrii, Aubé, Monogr. p. 28, pl. 83, f. 1? Révision, &c., p. 108?

Mr. Waterhouse has in his British collection a female *Bryaxis* which in size and colouring greatly resembles *B. Helferi*, but which is certainly distinct. He has no note of its locality. When compared with *B. Helferi* it differs in having the abdomen more finely and less thickly punctured, and hence this part is more glossy, and the two striolæ at the base of the first segment are much more widely separated:* the

* In these insects usually may be seen three transverse depressions at the base of the abdomen, close to the edge of the elytra, and the central depression is bounded by two nearly longitudinal but slightly diverging striæ; in the male of *B. Helferi* the space between the striæ is very nearly equal to one-third of the width of the convex part of the abdomen; in the female it is less, since it scarcely exceeds one-fifth; whilst in the female insect which Mr. W. supposes to be that of *B. Lefebvrii*, the space between the striæ is decidedly more than one-third of the width of the abdomen, not including the subreflected lateral margin.

insect is furthermore narrower, and has the humeral angles of the elytra more prominent. He has in his possession a male insect, from Paris, named *B. Lefebvrii*, which agrees most closely with the present insect in the points just noticed, and it agrees with the characters laid down for *B. Lefebvrii* (including the small size of the spur to the middle tibiæ), but here he finds a small spur to the anterior tibiæ, and he could see no spur to the hind tibiæ: in the descriptions the spur is said to exist on the middle and posterior tibiæ.

The third species belongs to the same section as *B. fossulata*, having the abdomen simple in both sexes; the anterior coxæ unarmed in the male, which sex is only distinguished by a small spine at the apex of the intermediate tibiæ; the three foveæ on the thorax nearly equal. In size it is equal to *B. sanguinea*, and its antennæ are as long as in the female of that insect, and hence longer than in *B. fossulata*: its colour is rufo-piceous; the elytra red, with the margins dusky; the legs fusco-testaceous. This species being apparently undescribed, the name *Bryaxis simplex* was proposed for it. A detailed description was communicated to the Meeting.

Lastly, Mr. Waterhouse called attention to a fine species of *Anobium* which had just been found by Mr. Turner in the neighbourhood of London: this would most probably prove to be the *A. denticolle* of Panzer; but the only specimens Mr. W. had had an opportunity of examining were two in Mr. Stephens's collection, one in very bad condition. Mr. Turner's insect differed from these in being very much larger, and apparently rather broader, being very nearly as large as *A. tessellatum*; its scutellum was apparently broader, and of a truly quadrate form.

Mr. Waterhouse also read the following

Note on the British Species of Clambus.

“The species of *Clambus* described in the second volume of Stephens's ‘Illustrations’ are:—

“1. *Clambus Armadillus*. The description appears to me to belong to *Agathidium minutum* of Sturm (= *Clambus minutus*, *Fairm. et Lab.* = *C. Armadillus*, *Redt.*), but *C. Armadillus* of Stephens's collection is identical with *C. Armadillo* of Fairm., and it is from this latter insect I have no doubt that the figure in the ‘Illustrations’ is taken.

“2. *Clambus coccinelloides* (Kirby MSS.) is represented in Stephens's collection by a specimen of *Chætarthria seminulum*. ‘I possess a single example of this insect, which was kindly given me by the Rev. W. Kirby,’ &c. (see *Steph. Illustr.* ii. p. 184).

“3. *C. Enshamensis*, *Steph. Illustr. and Collection*. This is identified (and, as it appears to me, correctly) with *Scaphidium dubium* of Marsham (*Ent. Brit.* p. 234) by Mr. Wollaston: it is the *Calyptomerus dubius* of Wollaston's ‘Catalogue of the Coleopterous Insects of Madeira,’ *C. Enshamensis* of Jacquelin Duval's ‘Genera des Coléoptères d'Europe,’ and *Comazus Enshamensis* of Fairm. et Laboulb. Notwithstanding that there are certain discrepancies, when the characters laid down by Redtenbacher for his genus *Calyptomerus* are compared with those which are displayed by *Clambus Enshamensis* of Stephens, it has been supposed that they were really taken from the same insect. We are informed, however, in the *Berlin Ent. Zeit.* 1857, p. 174, that *Calyptomerus alpestris* of Redt. (the only known species of the genus) is a

much larger insect than *Clambus Enshamensis*; and in Dr. Schaum's 'Catalogue,' 1859, p. 37, we find the two genera given as distinct, Fairmaire's genus *Comazus* being used for our British insect.

"In the fifth volume of the 'Illustrations' Stephens adds two other species of *Clambus* to our list, viz. :—

"*C. nigriclavis*, Rudd, MSS. (represented by a single specimen in the collection), which is the *C. minutus*, *Sturm.*, *Fairm.*, &c. = *C. Armadillus*, *Redt.*

"*C. nitidus*. I find no specimen bearing this name in the collection, and from the extremely brief description I am unable clearly to identify the species.

"Lastly, Stephens describes two species of the present genus amongst the species of *Agathidium*, viz., *A. minutum* = *A. minutum*, *Sturm.*; and *A. nanum* = *Clambus Armadillus*, *Fairmaire*, &c.

"Of the genus *Clambus*, as now restricted, I have met with three species pretty plentifully in the vicinity of London: I have seen no other British species. They are:—

"1. *Clambus minutus* (*Agathidium minutum*), *Sturm.* This is the largest of our species, and is readily distinguished by an almost total absence of pubescence on the upper parts; hence it appears much more glossy; its colour is pitchy black: the thorax is margined with rufo-testaceous, narrowly before and behind, but considerably extended on the sides of the thorax: the elytra very commonly have a bright rufous spot on the disk. The legs and antennæ are pale testaceous.

"2. *C. Armadillus*, *DeGeer*, *Fairm. et Lab.* Black; clothed (not very densely) with longish pale hairs; sides of the thorax very narrowly and indistinctly edged with testaceous; body beneath entirely black; antennæ and legs more or less dusky; the tarsi pale.

"3. *C. pubescens*, *Redtenbacher*. This is the smallest of the three species: it is distinguished by the upper parts being densely clothed with pale ashy pubescence (hence the insect has a somewhat dull appearance); the colour is black, but the apex of the elytra and the abdomen are more or less pitchy; the pale colour on the sides of the thorax is more extended than in the preceding species, and the legs are entirely of a very pale testaceous colour; the antennæ are also pale, with the exception of the club, which is somewhat tinted with brown.

"The form of the head likewise differs in these insects; and with regard to the last-mentioned species, I would call attention to the larger size of the eye, when compared with the preceding: here it occupies nearly the whole of the lateral lobe of the head, which is marked off by the antennal notch."

The following papers were read:—

"On the Geographical Distribution of the Family *Zygænides*," by Mr. W. F. Kirby.

"A Monograph of *Protophila*, a Genus of the Diurnal Lepidoptera," by Mr. W. C. Hewitson.

"Descriptions of new Species of Aculeate Hymenoptera collected at Panama by R. W. Stretch, Esq.; with a List of the described Species, and the various Localities where they have previously occurred," by Mr. Frederick Smith.

Part 8 of the current volume of the 'Transactions,' recently published, was on the table.—*E. S.*

*Presentation of a Testimonial to the Editor, by the Contributors to,
and Readers of, the 'Zoologist.'*

“TO EDWARD NEWMAN, Esq., F.L.S., F.Z.S., Mem. Imp. L.-C. Acad.,
Late President of the Entomological Society; &c., &c.

“DEAR SIR, — A high appreciation of the services rendered by yourself, in the promotion and diffusion of scientific knowledge, induced several gentlemen, of kindred tastes, to unite as a Committee for eliciting some public expression of a like estimation, which they had ample grounds for believing was very generally entertained by naturalists.

“It was not their object to obtain any large amount of Subscriptions, but rather to afford a suitable opportunity for the expression of a sincere and grateful goodwill on the part of those who had benefited by your persevering and unobtrusive labours in a good cause.

“The large sacrifice of your own time in assisting younger entomologists in the examination of the rich collection belonging to the Entomological Club; and in various other modes on behalf of Science and scientific men; the courtesy so constantly shown to all who seek information from you; the independence of your opinions, truthfully expressed, without giving just grounds of offence to those who differ from you; — these; and many other considerations, must amply warrant the step taken by the Committee; while also rendering explanations of that step almost needless among those persons who devote themselves to the study of Natural History.

“The ‘Zoologist’ has become a repertory of facts, in one department of Natural History, at once valuable as voluminous, and can scarcely be paralleled, in these respects, by any work in the libraries of Science. Botanists have had good reason to regret that the issue of its precursor and companion, the ‘Phytologist,’ long similarly serviceable in accumulating and diffusing knowledge in the allied branch of Natural History, was interrupted. While your own works, of a more individual character—as the ‘History of British Ferns,’ the

'Insect Hunters,' &c., &c.—have worthily procured for their author honourable place among the earnest promoters of Science.

"The consciousness of success achieved in the usually distinct spheres, the popular and technical, should bear with it its own reward, to one who has exerted himself so efficiently for public objects. We trust that it does so. But we also trust that you will consent to receive our slight testimony of goodwill and appreciation, conveyed in the appropriate form of Scientific Books, the merits of which may render them useful to you, while their costliness might have deterred you from indulging your taste by their purchase.

"Earnestly and respectfully we express our hope that no excess of modesty will prevent your assent to our wish that this Address should be printed in the 'Zoologist,' and remain,

"Dear Sir,

"Ever most faithfully yours,

"THE COMMITTEE."

(Acting on behalf of the undermentioned gentlemen.)

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To this Address the Editor has replied as follows.

“GENTLEMEN, — It would be untruthful in me to affect surprise, either at the cordial expression of goodwill contained in your Address, or at the value of the present by which it is accompanied. I have long been cognizant of the compliment intended me, and at first I did my best to escape it; positively refusing the use of the ‘Zoologist’ as a medium for publishing and promoting your views, and thus depriving you of the only means of communication between yourselves and that very limited portion of the public to whom my name is known.

“The following paragraphs, reprinted from the wrappers of the ‘Zoologist,’ will, I think, establish this assertion. The first dates March 1, 1860, and appears simultaneously with the Rev. Mr. Greene’s earliest allusion to the subject:—

“It must be understood that I take exception to the Rev. Mr. Greene’s proposition, as conveyed in the second paragraph of his communication. I am scarcely conceited enough to suppose that the motion will find a seconder; but, in the remote possibility of such a case, I beg to say that the ‘Zoologist’ is not at his service for such a purpose.”

“The second bears date April 1, 1860, and is in direct answer to an urgent request:—

“My brief note on the subject of the Rev. Joseph Greene’s most complimentary proposition appears to have been regarded by some readers as uncourteous on my part. I regret this should be the case. My feeling against a man’s having any complicity in getting up a Testimonial to himself is very strong indeed; and were the wrapper of the ‘Zoologist’ ever used for such a purpose, even though in the form of a paid advertisement (*verbum sapienti*), I should certainly subject myself to unworthy suspicions. I therefore say, most distinctly, that the ‘Zoologist’ is hermetically sealed against any communications thereanent. May I add a word more? I shall be obliged if my friends will abstain from writing to me on the subject.”

“The reason for my taking this course was threefold: in the first place, I have little taste for Testimonials, having often, as I believe, seen them given to the undeserving; in the second place, I never coveted for myself anything beyond the approbation of those who purchase my publications, and who, in the very fact of such purchase and approbation, abundantly repay any exertions of mine; and in the third place, I could not help feeling that in singling me out from a host of fellow-labourers in the same walks of Science, you placed me in an invidious and therefore undesirable position: in botanical, ornithological and entomological journalism, how much has been accomplished by others! how many have been labouring with zeal and success fully equal to my own! In accepting this Testimonial at your hands, I cannot escape the conviction that I am the cause of injustice to others; injustice which, though they are too high-minded to resent, I cannot defend or palliate on the plea of its being on my part entirely unintentional.

“Then, again, as I became aware of your fixed determination, as a Committee, to persevere, and as I was from time to time, by more or less direct means, made cognizant of your proceedings, I could not help feeling that the absence of many a familiar and friendly name from the list was in itself a silent rebuke, a demonstration of conscientious disapproval, although only perceptible to him who could appreciate the cause.

“But, turning to the other and brighter side of the picture, the very circumstances which seemed to wound, carried with them their own cure. Exactly in proportion as so many of my familiar friends held aloof; exactly in proportion as this mark of esteem originated with and has been carried out by gentlemen who knew me only as author and journalist, from gentlemen whom I have never visited and who have never visited me; so is this Testimonial immeasurably more valuable than it would have been had the design emanated from my nearest and dearest friends, from men whose partiality might blind their judgment, and who would be too glad to embrace any opportunity of doing me a kindness. This munificent present and this gratifying Address stand on a very different footing; and I accept them, most gratefully, as tributes to supposed merit, as acknowledgments of supposed services in the cause of Natural History.

“You do not explain, or even allude to, an act of considerate kindness that has been peculiarly gratifying to me; I mean your

allowing me to choose the form the Testimonial should take. I believe that the more usual present of plate, or some durable ornament bearing a record of the event, would have been more consonant with the wishes of some of those who have so liberally subscribed; but you, as a Committee, have, without hesitation, yielded to my strongly expressed wish for books, allowing me to make my own selection; a selection which I trust will be as serviceable to others as to myself; and the remote probability of their becoming obsolete, or being worn out, before these events happen to myself, cannot be reasonably contemplated. And let me here express a fervent hope that, should my life be spared for a few more winters, my choice will be approved by those who occasionally seek, at my hands, the information you have thus afforded me the opportunity of diffusing.

“A printed List of the Subscribers will appear in every volume; and you may believe me, gentlemen, when I say that I shall point to this List as the record of one of the most pleasant events that have occurred during the course of my Natural-History labours; labours always of love, but now, by your kindness, rendered doubly agreeable.

“Finally, I may express the great pleasure I feel in acceding, without a moment's hesitation, to your request to insert your flattering Address in the pages of this journal. Now that the subscription has closed, I can have no motive in withholding from my readers and contributors the record of an event which I feel confident will be as gratifying to them as to myself: the ‘Zoologist’ belongs to my contributors far more than to myself: its unparalleled value as ‘a repository of facts’ is of their creation: my reward is their reward, my triumph their triumph. The annals of journalism do not afford a second instance of such entire unity of purpose and cordiality of feeling as exists between the contributors to the ‘Zoologist’ and its nominal manager.

“It only remains, gentlemen, that I subscribe myself,

“Most gratefully and faithfully yours,

“EDWARD NEWMAN.

“7, York Grove, Peckham,
March 25, 1861.”

Buck-shooting in the Korea.—Forming one side of the pleasant harbour of Chusan, in the Peninsula of Korea, is a long high island, familiarly known by us under the name of Deer Island, although its proper appellation is Tsi-kiung-tau. On this island there is a species of deer, a kind of Moschus, the size of a sheep, the male of which is without antlers, and the mouth armed with very long, sharp-edged, curved, canine teeth in the upper jaw. They keep very close under cover, and when driven from the shelter of the dense underwood they bound wildly along, and may then be shot like hares. The lower part of their haunt is shared by half-wild horses, which go in large troops, snorting, prancing and neighing, or suddenly halting, and having a good long stare at the intruders on their domain. Here are level grassy plains, where there are ponds with teal, ducks, frogs and water-beetles; where the mountain-springs form little trickling rivulets, sometimes heard murmuring in subterranean channels under your feet; where you find the Centaurea and the bird's-foot trefoil, the willow, the Iris and the pink; where the humble-bees wander, droning over the tops of the flowers; where I capture three or four species of Apoderus, one with an egregious long neck; where I beat Balaninus from the young oaks, and a Cryptorhynchus from the Eleagnus bushes; where Melasoma is common on the willows, and two species of Euchlora on the trailing Smilax; and where the Apollo butterfly and the swallow-tail sun their gorgeous wings. There are a few rude huts, with perchance a solitary woman, in the universal white Korean garments, may be seen pounding millet near the low door-way, while the husband smokes his pipe on the threshold. Higher up you come to huge stones and masses of rock, all gray and green and yellow with lichens, and with Eleagnus bushes growing up between them. From this you gradually make your toilsome way to Wilford's Rest, where our weary botanist reposed awhile after gaining the summit of the island. Here, among stubborn thorny Smilax and dwarf oak, and great loose stones, forming a short dense scrub, are the peculiar fastnesses of the deer. Without dogs, you would imagine, they were quite unapproachable. However that may be, let me record, with a proud satisfaction, that no less than nine deer fell before the ardour, skill and patience of my messmates. Sutherland, untiring and sagacious, slays two fat bucks, after toiling and moiling all the livelong day, and now gazes on their lifeless forms with a smile of grim satisfaction; a beetle-hunting Doctor, in a quiet bosky dell, is startled by loud shouts from the hill-side high up among the Smilax vines and oak scrub, and Warren is seen wildly flourishing a bloody knife, shouting in triumph, for has he not brought down his deer and cut its throat; down a crooked stony path, panting under the carcase of a fine buck, Wilford advances, staggering but elated; while Schuckburgh comes jauntily in, a young doe slung across his shoulders, and flings it down as if he had been accustomed to that sort of thing from infancy.—*Arthur Adams.*

Golden Eagle nesting in Scotland.—You express a doubt (Zool. 7394) as to the golden eagle breeding in Britain. From 1844 to 1847 I had the shooting over the Lochalsh, a large district in the west of Ross-shire. During that time I had as many as four old birds shot by one of the keepers. These birds were all shot in the spring, and in one instance one of them was killed off the nest, in which there were two eggs. These eggs I sent to the Norwich Museum, and they are probably there now.—*E. C. Buxton; Daresbury Hall, Warrington, March 30, 1861.*

Brief Notes on the Birds of New Zealand.

By J. B. ELLMAN, Esq.

It is a long time since I had the pleasure of writing anything for the 'Zoologist.' Since then I have been residing in New Zealand, and, as opportunity offered, have jotted down various results of my rambles. It will be observed that the distance of the islands from any northern or southern continent precludes much migration. The climate is temperate — colder in summer and warmer in winter than England. I have never seen ice on the lakes, or snow near the coast. Our birds are not musical; daybreak and sunset alone give forth the notes of our songsters. A minute description of each species being unsuited to these pages I have only given partial ones of such species as are closely allied to others, or require particular notice. The native names are given after the English; where no author is mentioned I am responsible for the Latin name. All the species are common unless otherwise stated.

RAPTORES.

Fam. FALCONIDÆ.

Common Brown Hawk (Kahu or Kahu papango), *Falco harpe, Forster*. Becomes brown by age, the young being much spotted with white. Irides dark brown.

White or Goldeneyed Hawk (Kahu or Kahu korakorako), *Falco auriculus*. In August, 1854, I was duck shooting, when a shadow crossed my path. Looking up I saw a hawk, apparently with white under plumage; deeming it an interesting variety of the common brown hawk I shot it. I have since obtained several specimens. Its chief distinguishing characteristics are as follows. Irides bright yellow. Under plumage pure cream-colour in adult birds, spotted with rufous when young; the spots disappear by age. Cry very loud, resembling that of a child in pain.

Little Falcon (Karearea or Kaiaia), *Falco brunnea, Gould*. A very fearless bird, rather larger than a female merlin, with a similar plumage; will attack men if the nest is approached.

Fam. STRIGIDÆ.

Common Owl (Ruru or Koukou), *Strix fulva, Forster*. Very similar to your little owl. All night calls "kou-kou," a sound resembling the words "more pork!" by which name it is commonly known among the settlers.

Little Owl (Ruruwekau), *Strix parvissima*. A very scarce bird, not larger than a starling. The head is very large. I have never obtained a specimen, but have seen it among the forests. It is an exceedingly shy bird.

INSESSORES.

Fam. MUSCICAPIDÆ.

Fantailed Flycatcher (Titiwaiko or Ti-wakawaka), *Muscicapa ventilabrum*, *Forster*. Has a habit of spreading its white tail, like a fan, hence its name.

Largeheaded Tit (Miro-miro), *Muscicapa macrocephala*, *Latham*. Inhabits forests.

Brown Tit (Miro-miro), *Muscicapa melanura*, *Dieffenbach*. Closely allied to the preceding. Habit similar. Tail white.

Fam. MERULIDÆ.

Thrush (Koropio or Piopio), *Turnagra crassirostris*, *Gray*. Commoner in winter than in summer in forests in the north Island. Probably many go south to breed.

Fam. LUSCINIDÆ.

Stonechat (Miro-miro), *Muscicapa albifrons*, *Gray*. Habits identical with the English species.

Robin (Katoitōi or Pitoitōi), *Muscicapa longipes*, *Lesson*. Rather larger than the English species. It is almost impossible to stop anywhere without one of these pretty creatures coming to you.

Reed Wren (Kotata or Matata), *Sphenæacus punctatus*, *Gray*. Very short wings; cannot fly far. Long pointed tail. Creeps among fern and reeds, occasionally coming to the top to whistle a single note. At other times it utters a curious noise, similar to that made by pressing the tongue against the teeth, and imitating the call of a hen to her chickens.

Yellowbreasted Tit (Miro-miro), *Muscicapa minutus*, *Forster*. Inhabits forests.

Whitebreasted Tit (Toitōi), *Muscicapa albopectus*. Inhabits forests.

Whiteheaded Tit (Popokotea), *Certhiparus urostigma*, *Forster*. Inhabits forests.

Ashcoloured Wren (Riroriro), *Certhiparus cinerea*.

Bartailed Wren (Horirerire), *Certhiparus maculicaudus*, *Lesson*. Rather larger than the preceding species, from which it may always

be distinguished by a circular white spot at the tip of each tail-feather. Said by the natives to be a bird of passage from the Polynesian Islands. I do not think such is the case.

Fam. ALAUDIDÆ.

Lark (Hioi, Whioi or Pi-oioi), *Alauda Novæ-Zelandiæ*, *Latham*.

Fam. CORVIDÆ.

Crow (Kokako), *Callaeas cinerea*, *Latham*. Found only in forests.

Fam. STURNIDÆ.

Redbacked Thrush (Tieki, Tierawaki), *Sturnus carunculatus*, *Forster*. A very noisy bird. Inhabits forests. Has a flesh-coloured wattle under the eye. Plumage jet black, with the back and wing-coverts red.

Fam. CERTHIDÆ.

Goldfinch (Pihipihī), *Acanthisitta citrina*, *Latham*. Gregarious. Very abundant in some forests.

Mountain Wren (Piwauwau), *Acanthisitta tenuirostris*, *Gray*. Only found on the snowy ranges.

Longlegged Wren (Kakaruai), *Acanthisitta longipes*, *Latham*. Inhabits forests.

Spotted Wren (Mako), *Acanthisitta punctata*, *Gray*. Inhabits forests.

Fam. UPUPIDÆ.

Huia (Huia), *Neomorpha Gouldii*, *Gray*. A very scarce bird. Only found on the summits of the mountains in the neighbourhood of the Wairarapa, near Wellington. A very tame bird. Colour jet-black. Wings short. Tail curved, like the blackcock's, barred with white at the tip. Has a pink wattle on each cheek. Legs yellow, and very long. The male has a straight bill; the female a curved one and much longer. It is fast becoming extinct.

Fam. MELIPHAGIDÆ.

Mocking Bird (Tui-koko), *Meliphaga Novæ-Zelandiæ*, *Gray*. Black, with two white feathers protruding from the chin, hence called the parson bird. Is easily taught to talk, and is very fond of imitating any sound. Excellent eating.

Yellowwinged Finch (Kotihe, Tihe or Ihi), *Meliphaga cincta*, *Gray*. Inhabits forests.

Bell Bird (Kopara, Kokomako), *Anthornis melanura*. At daybreak

and sunset these birds assemble for a period of half an hour, and simultaneously give forth enchanting music, consisting simply of four descending notes — E, B, B, E,—commencing on the E above the staff, the third note being an octave below the second.

Fam. HALCYONIDÆ.

Kingfisher (Kotare), *Halcyon vagans*, *Gray*. Builds in holes of trees. Cries like a wryneck.

Fam. PSITTACIDÆ.

Parrot (Kaka), *Nestor meridionalis*. Excellent eating.

Redheaded Parroquet (Kakariki), *Platycercus Novæ-Zelandiæ*, *Forster*. Excellent eating.

Goldenheaded Parroquet (Potarakina), *Platycercus auriceps*, *Vigors*. Closely allied to the preceding. Abundant in forests.

Great Night Parrot (Kakapo), *Strigops habroptilus*, *Gray*. A very rare bird. As large as a fowl. Only appears by night. Cannot fly. Lives in holes in the ground. Feeds on leaves and berries. Most numerous in the Southern mountains of the middle Island. It was much prized for food, and used to be abundant.

Fam. CUCULIDÆ.

Cuckoo (Koekoea), *Cuculus taitensis*, *Latham*. A summer visitor from the Polynesian Islands. Habits similar to the English species.

Goldenspotted Cuckoo (Pipiwarauoa), *Cuculus lucidus*, *Latham*. Another extremely beautiful visitor from the Polynesian Islands. Green and gold bands and spots on the breast and belly. Arrives about the 10th of October, and leaves the 1st of March. Cries like a wryneck. Considered a sacred bird by the natives.

Fam. HIRUNDINIDÆ.

Hitherto I have never seen or heard of a species of this tribe. It is singular that, being in the same parallel of latitude as Southern Australia, where swallows are plentiful, and not being much over one thousand miles in a straight line from that continent, with heavy westerly gales blowing direct to our coasts, the species so common there should not have found their way to us.

Fam. COLUMBIDÆ.

Pigeon (Kereru, Kuku or Kukupa), *Columba Novæ-Zelandiæ*, *Latham*. Delicate eating. In July and August it feeds on the leaves

of a bitter shrub — the Kowhai — which imparts a bitter taste to the flesh.

RASORES.

Fam. TETRAONIDÆ.

Quail (Moho koreke), *Coturnix Novæ-Zelandiæ*, *Buffon*. Very scarce now in the North Island. Abundant in the middle.

Fam. STRUTHIONIDÆ.

A few centuries ago there were several species in this division; most of these are now extinct. Of the gigantic Struthionidæ bones of many species occur all over the Islands. Feathers have also been found, and fragments of egg shells; also one perfect egg, taken out of the grave of a native, in 1856. It is believed by many natives that none of the species are entirely extinct. They give tolerably minute descriptions of many species, but it is impossible from their descriptions to define the number formerly existing. Professor Owen has detected fourteen distinct species from the various bones which have from time to time been sent to England. Wherever the bones of the larger species are found there exists about a quart of pebbles, used doubtless to assist digestion. I can only give the native names and descriptions of a few extinct species. All these birds were hunted by the natives for food.

Moa. The largest species stood sixteen feet high. Colour red-brown. Fed on leaves of forest trees; their legs were too long to allow them to eat off the ground. Bones full of marrow.

Kiwi Papa Whenua. Seven feet high. One of the last birds to disappear. There are still living men who have hunted it.

Tokoeka. Three feet high. Bright red. Inhabited only the snowy mountains in the neighbourhood of Otago.

Po-waka-i. Ten feet high. Lived on carrion as well as plants. Peculiar to the middle Island.

Kiwi Mokemoke. Three feet high. A solitary ash-coloured bird, with a long curved bill. These are all the traditions of the preceding five birds to be relied on. It is highly probable that this species and other smaller ones yet exist among the wild unexplored mountain ranges of the middle Island.

Great Apteryx (Kiwi Parure), *Apteryx major*. Inhabits forests and mountains. A night bird. By imitating its call it is attracted and then caught with dogs. It is also caught by lighting a large fire, which is sure to attract them. Native report says that this and the next described species do not sit on their eggs, but cover them up with

leaves, the decomposition and fermentation of which, at the expiration of one year, hatches the egg. Probably this report is mere fiction, and the bird always covers its egg on leaving the nest. This species only lays one egg. Its legs are very powerful, sufficiently so to break the leg of a dog. The egg is white and three inches in length.

Little Apteryx (Kiwi Hoihoi). Smaller than the preceding. My dogs have caught this bird. Lays two eggs. Habits similar to the preceding.

GRALLATORES.

Fam. CHARADRIDÆ.

Redwinged Plover (Tuturiwatu), *Charadrius xanthocheilus*, Gray. Has a broad red band on the breast. Beak tawny, black tip. Resembles the English ringed plover.

Blackringed Plover (Tuturiwatu), *Charadrius atricinctus*. Has, I believe, hitherto been called *C. torquatulus*, a name equally applicable to the preceding species. Smaller than the preceding. One narrow black band on the breast. Beak black, twice as long as the preceding species.

Spotted Plover (Pohoera), *Charadrius obscurus*, Latham. Closely allied to the English turnstone.

Dotterell (Pohoera), *Charadrius frontalis* (?), Lesson. Identical with the English species (?). Never seen inland.

Black Oystercatcher (Torea-nui), *Hæmatopus niger*. Jet-black. Beak and legs red. Rather scarce.

Pied Oystercatcher (Torea-nui), *Hæmatopus picatus*, Vigors. Both these species are much smaller than the English, which they resemble in habits.

Fam. ARDEIDÆ.

White Heron (Koutuku), *Ardea alba*. A beautiful snow-white bird. Very abundant in the island of Ruapuke; scarcer in northern parts. Builds in high trees. Gregarious.

Blue Heron (Matuku-wai-tai), *Ardea cinerea*. Scarce. Only seen among rocks on the coast.

Bittern (Matuku hurepo), *Botaurus melanotus*, Cuvier.

Little Bittern? A missionary, a good naturalist, once assured me he shot a very diminutive bittern, resembling our own little bittern, but in travelling he lost the skin. I have no knowledge of such a bird.

Spoonbill (Koutuku ngutu-papa), *Ardea latirostrum*. Very scarce. I only know of a single specimen shot at "Castle Point" on the east coast of the North Island.

Fam. SCOLOPACIDÆ.

Godwit (Kohikuhikuaka), *Gallinago punctata*. Very similar to the English bartailed godwit. Gregarious. Plentiful on the coast.

Avocet (Piwari), *Avocetta Novæ-Zealandiæ*. Local. Confined to the southern portions of the Island.

Black Stilt (Torea-iti), *Himantopus niger*. Jet-black.

Pied Stilt (Tore-aiti), *Himantopus picatus*. Of various proportions of black and white.

White Stilt (Torea-iti, Tutumata), *Himantopus albus*. This species is scarce, smaller than the preceding, and is not subject to varieties of plumage. The head, neck, back, breast and belly are pure white. The wings are of an indigo-black. Both sexes are similar in plumage. All three species are the torment of duck shooters, by their incessant cry on approaching them. As soon as they call "peet peet" every duck takes wing. They are very bold, and will continue to fly round the shooter so long as he is in their neighbourhood.

Fam. RALLIDÆ.

Notornis (Takabe), *Notornis Mantellii*. Discovered by my friend Mr. Mantell. A very large bird, nearly as large as a turkey. Is only found in the middle Island.

Woodhen (Weka), *Rallus australis*, *Latham*. Inhabits wild countries, especially creeks. Resembles in plumage and size a hen pheasant minus the tail. Bill curved like that of the whimbrel. Has a loud whistle, by imitating which it is attracted; also attracted by fire. A night bird. Delicate eating. Wingless, but runs very fast. Mixes with fowls, and cross breeds have occurred.

Redlegged Rail (Moho pereru), *Rallus rufopes*.

Greenlegged Rail (Moho patatai), *Rallus punctatus*. Spotted on the back.

Ferruginous Rail (Moho katatai), *Rallus assimilis*. Scarcer than the two preceding. All three are about the size of the spotted crake, which they resemble. Mostly found in swamps. They have a peculiarly jarring note, resembling the noise of the catch of a windlass when it is rapidly revolving.

Little Black Rail (Totoriwai), *Rallus minor*. Very scarce. Jet-black. Irides yellow.

Great Black Rail (Moho), *Rallus niger*. This bird was formerly very abundant, and the most highly esteemed of the genus for food.

Great Red Rail (Moho kura), *Rallus rufus*. This species was as

large as a moorhen, and much prized for food. It is of a mottled red and brown. Confined to the mountains.

Great Brown Rail (Moho weka), *Rallus fuscus*. Larger than the last species. Almost extinct. Dark brown. Irides black. Inhabits forests.

Great Spotted Rail (Moho pu), *Rallus strepitans*. Spotted all over with red, and white spots on a brown ground. Makes a peculiar booming noise, resembling distant thunder, hence its name, "pu;" for this reason I have called it *strepitans*. Almost extinct. In former years many more species of this tribe were abundant, but the introduction of cats has greatly thinned them. Cats seem to have a remarkable preference for the *Rallidæ* above all other birds. A few years will see most of the above described birds, except the redlegged, greenlegged and ferruginous rails, extinct. The habits of these species, which dwell in swamps, will protect them from extermination.

Moorhen (Pukeko, Pakura), *Porphyrio melanotus*, *Temminck*. The flesh has a bitter flavour.

NATATORES.

Fam. ANATIDÆ.

Paradise Duck (Putangitangi), *Anser variegata*, *Latham*. A very handsome goose. Easily tamed. Is becoming numerous.

Gray Duck (Parera, Tahora), *Anas superciliosa*, *Latham*. The common wild duck. Delicate flavour.

Black Duck (Papango), *Anas atra*. A small black species, with a white bar across the wing. Irides golden. Confined to fresh water.

Shoveller (Pakau-kuku, Rangi-tauharuru), *Anas rhynchotes*, *Latham*. Resembles the English species. Confined to the coast. Makes a great noise with its wings on rising.

Lapped Bill Duck (Whio), *Anas malacorhynchus*, *Forster*. A lead-coloured duck, with a soft fleshy lappet at the extremity of its bill, which is white. Is very stupid and easily snared or killed with a stone. Confined to mountain streams.

Teal (Tetewai), *Anas fusca*. Rather larger than the English species.

Mountain Teal (Parera), *Anas mediterranea*. Only found on lagoons inland.

Fam. COLYMBIDÆ.

Little Grebe (Weiweia), *Podiceps rufopectus*, *Gray*. Resembles the English species.

Crested Grebe? Found on lagoons in the middle Island. Unknown to me.

Fam. ALCADÆ.

King Penguin. I have seen this species off the coast of Stewart's Island; I believe it breeds there.

Little Penguin (Korora), *Spheniocus minor*, *Temminck*.

Great Penguin (Ho-i-ho), *Eudyptes antipodes*. Chiefly confined to the middle Island.

Fam. PELECANIDÆ.

Gannet (Taiko, Takapu), *Jula australis*, *Gould*. Resembles the English species.

Crested Cormorant (Kauau pari), *Pelecanus cirrhatus*, *Gray*. Ash colour, spotted with black. Belly white. Legs yellow. Male has a fine crest. Peculiar to the coast. Breeds in cliffs.

Little Black Cormorant (Kauau pango), *Pelecanus carboides*, *Gould*.

Whitethroated Cormorant (Kauau), *Pelecanus varius*, *Forster*. Easily distinguished by the white throat, breast and belly.

Whitethighed Cormorant (Kauau tua-whenua), *Pelecanus flavirostris*? *Forster*. A very large cormorant, with a white spot on each thigh. Greenish black. Beak yellow. Breeds inland.

Great Green Cormorant (Kauau nui), *Pelecanus major*. A dark green cormorant, the largest of the tribe. Breeds inland.

Fam. LARIDÆ.

Common Gull (Karoro), *Lestris antarcticus*. This bird seizes mussels with its beak, and flies to a height of thirty or forty feet, letting them fall on the beach, repeating this process until the shell is broken. If it finds a mussel with open shell in shallow water, it drops a pebble in to prevent the shell from closing. White. Wings black.

Brown Gull (Karoro), *Lestris fuscus*, *Latham*. Distinguished from the young of the preceding by its white irides.

Little Gull (Tara punga), *Lestris scopulinus*, *Forster*.

Fam. STERNIDÆ.

Great Tern (Tara kakao), *Sterna major*. Expanse of wings four feet. Primaries tipped with black. A very noisy bird. Confined to the coast.

Common Tern (Tara nui), *Sterna vulgaris*. Identical with the English species. Beak and legs red.

Blacklegged Tern (Tara nui), *Sterna atripes*. Distinguished from the preceding by its black beak and legs.

Little Tern (Tara paku), *Sterna parva*. One half the size of the common tern, but exactly similar in plumage.

Gray Tern (Tara), *Sterna cinerea*. Often found inland as well as on the coast.

Fam. PROCELLARIDÆ.

Mutton Bird (Titi), *Procellaria tridactyla*, *Forster*. Breeds in the mountains. Is often caught at dusk, on a dark foggy evening, by lighting a fire on a conspicuous spot, towards which it is sure to fly on its return from sea. It is then killed with a stick.

Cape Pigeon, *Procellaria punctata*. Very common on the coast of the middle and south Island.

Whale Bird, *Procellaria* ——— ?

Storm Petrel (Oi), *Procellaria æquinoctionalis*, *Latham*.

Great White Albatross (Torva), *Procellaria* ——— ?

Brown Albatross (Torva pango), *Procellaria* ——— ?

Ashcoloured Petrel (Titi), *Procellaria* ——— ?

Grayheaded Black Petrel (Titi makawe), *Procellaria* ——— ?

All the above species, and many others with which I have very little acquaintance, breed in great numbers on the Snares Islands, south of Stewart's Island; some also breed on the mainland, but I have not paid sufficient attention to them to accurately define them. I believe that there are yet perhaps fifty species of undescribed birds, and I hope that the above brief notes may be the means of drawing the attention of observers, who are more competent and more at liberty than I am, to the Ornithology of New Zealand.

The above notes give the following analysis:—

Raptores	5
Insessores	31
Rasores	3 (living)
Grallatores	27
Natatores	34
Total	100

J. B. ELLMAN.

Lewes, March 8, 1861.

Collected Observations on the Nests and Eggs of British Birds.

By EDWARD NEWMAN.

(Continued from p. 7449.)

HAWFINCH, *Fringilla coccothraustes*.

Situation. "The situation of the nest is various; but it is most commonly placed in an old scrubby whitethorn bush, often in a very exposed situation; they also frequently build on the horizontal arms of large oaks, the heads of pollard hornbeams, in hollies, and occasionally in fir trees in plantations; the elevation at which the nest is placed varying from five to twenty-five or thirty feet."—*Mr. Doubleday.*

Materials. "The most correct description of the nest which I have seen is in Latham's 'Synopsis.' It is there said to be composed of the dead twigs of oak, honeysuckle, &c., intermixed with pieces of gray lichens; the quantity of this last material varies much in different nests, but it is never absent; in some it is only very sparingly placed among the twigs; in others the greater part of the nest is composed of it; the lining consists of fine roots and a little hair. The whole fabric is very loosely put together, and it requires considerable care to remove it from its situation uninjured."—*Mr. Doubleday.*

Eggs, 4—6. "The eggs vary in number from four to six, and are of a pale olive-green, spotted with black, and irregularly streaked with dusky gray. Some specimens are far less marked than others, and I have seen some of a uniform pale green."—*Mr. Doubleday.*

Mr. Selby's account of the nest and eggs of this bird appears to me entirely erroneous.

GOLDFINCH, *Fringilla carduelis*.

Situation. Gardens and orchards, seeming to prefer cultivated to uncultivated districts; often in evergreens, sometimes in roses and other trees trained against a house.

Materials. Lichen, moss, a little hay and wool most compactly interwoven, and lined with hair and the seed-down of the willow.

Eggs, 4, 5. White, tinged with blue, spotted with raw sienna at the larger end.

SISKIN, *Fringilla spinus*.

Situation. In furze bushes, about three feet from the ground: the eggs were taken, hatched under a canary and reared.—*Mr. Yarrell.* Mr. Newton (Zool. 3707) gives a most interesting account of siskins breeding in confinement. The nest is rarely found in Britain.

Materials. Green moss, dried grass, small twigs, rabbits' down and sometimes feathers. "I have a siskin's nest, taken in Scotland, that is built of fine grass and mosses, not one feather, a few small dead bird twigs outside, and lined with fine grass and a very little wool."—*Mr. Bond.*

Eggs, 4, 5. "Of a bluish ground-colour, some being spotted and others marked with rust-colour, either in well-defined dark spots about the larger end or cloudily dispersed over the whole surface."—*Mr. Newton.*

LINNET, *Fringilla cannabina.*

Situation. In whitethorn, blackthorn or furze bushes; rarely in trees.

Materials. Moss, bents and wool, lined with hair and feathers. "I don't think I ever saw a nest without fine fibrous roots in it: I have two nests built almost entirely of fibrous roots; one has only a small quantity of wool and the other a small quantity of horsehair in addition."—*Mr. Bond.*

Eggs, 4—6. White, tinged with blue and speckled with purple-red.

LESSER REDPOLE, *Fringilla linaria.*

Situation. In the alders or willows and sallows which so often fringe the streams and ponds in mountain or lake districts. *Mr. Bury* informs us (*Zool.* 643) that two nests of this little bird have been found in the Isle of Wight.

Materials. Moss and hay outside, lined with the down of the catkins of the willow. "As smoothly lined with the beautiful white catkins of the willow as a box of jewels with the finest cotton-wool."—*Mr. Hewitson* (*Zool.* 3027).

Eggs, 4, 5. Very pale blue-green, speckled about the larger end with orange-red. "The eggs are sometimes so blue as to retain much of the colour after they are blown."—*Mr. Hewitson* (*Zool.* 3027).

TWITE, *Fringilla montium.*

Situation. "Amid the tops of the tallest heath in the mountainous districts of England and Scotland."

Materials. "Composed of dry grass and heather, lined with wool, fibres of root, and the finer parts of the heath."—*Mr. Selby.*

Eggs, 4, 5. "Of a pale bluish green colour, spotted with pale orange-brown."—*Mr. Selby.*

BULLFINCH, *Loxia pyrrhula.*

Situation. In very thick garden hedges and in thick bushes in woods. Although the bullfinch is so common a cage-bird I have known but of a single instance of its breeding in confinement: I am

indebted to Mr. Gurney Barclay for a narrative of this interesting circumstance: "In 1837 a pair of these birds, which had been caged some months, were observed eagerly picking up moss and hair in the room in which they were accustomed to fly loose, and on their being furnished with materials speedily constructed a nest, chiefly of fibrous roots, similar to that of a bullfinch in a state of nature. The female laid five eggs, from which three young birds were hatched."—*Zool.* 453. The bullfinch sits on her eggs with such steadfastness that she will allow herself to be handled without leaving the nest: instances of this have often been recorded. I cite one: "A female while sitting once allowed me to pass my finger several times down her head and back without taking wing. I did this on two or three occasions; once in presence of other persons: the bird would open her beak in a threatening manner, and submit open-mouthed to my caresses."—*Rev. C. A. Bury* (*Zool.* 643).

Materials. Twigs, fibrous roots; a loose, carelessly constructed nest. I have had many opportunities of watching the whole process of nidification and incubation in this bird, and have found the female sit so close that you may stroke her back with a finger without inducing her to leave the nest. I never found the male engaged in incubation.

Eggs, 4, 5. White, tinged with blue, and spotted with raw sienna-brown.

CROSSBILL, *Loxia curvirostra*.

Situation. Fir trees, near Hampton Lodge, Surrey.

Materials. "The nest is rather small in proportion to the size of the bird, being only four inches and a half across the top, outside measure, where it is widest, and the central cavity but three inches in diameter. The outside is strengthened with a few slender twigs of fir, then a layer of coarse dry grass, lined with finer grass and a few long hairs. It is lodged close to the central or main stem of a Scotch fir, about thirty inches below its highest point, at the base of the shoots; here the nest is supported underneath by five or six ascending lateral branches of the fir, which so entirely conceal it that it can scarcely have been perceptible from the ground, and the occasional visits of the parent birds probably betrayed their retreat."—*Mr. Long, of Hampton Lodge, near Farnham.* "Four or five years ago the Scotch firs in the Holt Forest were cut down to allow more room for the growth of the young oaks: when the trees were thrown four nests of the crossbill were found in their topmost forks."—*Mr. Lewcock* (*Zool.* 189).

Eggs, 4, 5. "The eggs measure seven-eighths of an inch in length and five-eighths of an inch in breadth; the colour white, slightly tinged with pale skim-milk blue, and sparingly speckled with red."—*Mr. Long*.

STARLING, *Sturnus vulgaris*.

Situation. In hollow trees, holes in the walls of ruins, sea cliffs, and more commonly in houses, entering a hole under the eaves. They have bred in the house I inhabit for many years.

Materials. Sticks, straw, hay, roots.

Eggs, 4. Delicate pale blue, unspotted.

I have frequently known three old birds to one nest.

CHOUGH, *Pyrhocorax graculus*.

Situation. In the holes of ruins and near the sea, and in sea-cliffs and sea-caves.

Materials. Sticks, lined with a great quantity of wool and hair.

Eggs, 5, 6. Dirty white, spotted and blotched, more especially at the larger end, with raw sienna-brown and ash-colour.

RAVEN, *Corvus corax*.

Situation. Tops of lofty trees or crevices of sea-cliffs and other inaccessible rocks.

Materials. Sticks of various sizes, lined with wool and hair.

Eggs, 5, 6. Gray-green, spotted and blotched with smoky brown.

CROW, *Corvus corone*.

Situation. Tops of trees in woods.

Materials. Sticks, the larger outside, the smaller inside; these latter plastered with mud, clay or cowdung; lined with wool and horsehair.

Eggs, 4, 5. Gray-green, blotched and spotted with smoky brown. "I have eggs, both of the crow and rook, of a clear blue, without spots."—*Mr. Bond*.

HOODED CROW, *Corvus cornix*.

Situation. In rocks and sea-cliffs in Scotland; sometimes in trees. "The hooded crow breeds in the islands of Loch Maddie in great abundance, building a nest very similar to that of the carrion crow, and laying four or five eggs rather smaller than the carrion crow's, and of a greenish blue colour, freckled with brown."—*Sir William Milner* (Zool. 2015).

Materials. Sticks, heather, wool.

Eggs, 4, 5. Gray-green, blotched and spotted with smoky brown.

ROOK, *Corvus frugilegus*.

Situation. The tops of tall trees, generally in the neighbourhood of

country mansions: this bird is gregarious: rooks build very early in the year, often in the winter: it is recorded (Zool. 868) that a pair laid in November; the female sat and the eggs were hatched about the 18th; the young ones died of cold. Mr. Norman relates that two pairs of rooks built nests and reared their young on the top of a house in Hull. Rooks have been induced to form a colony or rookery in a spot where it was desired, by taking the eggs out of a magpie's nest, and substituting those of a rook: the young rooks were brought up by the magpie, and next year established themselves in the same locality: Colonel Newman relates this interesting fact (Zool. 3327).

Materials. Large sticks, hay, straw, &c.

Eggs, 4, 5. Gray-green, spotted and blotched with smoky brown.

Note.—I am unable to define any difference in colour between the eggs of the raven, crow, hooded crow and rook.

JACKDAW, *Corvus monedula*.

Situation. Towers of churches, ruins, rocks, chalk-pits, hollow trees; sometimes in holes in the ground, especially rabbits' burrows.

Materials. Sticks, straw, large feathers.

Eggs, 4—8. Pale green-blue, spotted with dingy brown; the spots confluent at the larger end.

MAGPIE, *Corvus pica*.

Situation. In trees, generally tall ones, but sometimes in low bushes—even in gooseberry bushes.

Materials. The outer and upper portion of the nest, which is almost spherical and domed, is composed of thorny sticks and brambles; smaller and thornless sticks are inside these, and then follows a lining of clay, which in its turn is covered with fibrous roots and hay. There is a circular hole on the side, through which the birds enter: the incubating bird has its head pointing towards this hole. A popular belief gives a second hole to the magpie's nest, opposite the first; the object of this is supposed to be to allow the bird's long tail to pass out: I cannot corroborate this view.

Eggs, 6—8. Yellow-gray, speckled with yellow-brown.

JAY, *Corvus glandarius*.

Situation. In the thickest parts of woods.

Materials. Sticks, roots; small fibrous roots for lining.

Eggs, 5, 6. Pale greenish blue, very thickly sprinkled with minute brown spots, often confluent on the larger end, where there are generally three or four irregular black streaks.

GREEN WOODPECKER, *Picus viridis*.

Situation. In the trunk of a tree, particularly the aspen and black

poplar, in a hole which is frequently made by the bird itself, and is generally very round and of great depth.

Materials. None, except the particles of wood chipped off by the birds in the process of boring.

Eggs, 3, 4. White, with a slight tinge of blue. Mr. Newton (Zool. 2229) mentions eggs of the green woodpecker "spotted and blotched with reddish brown and tawny yellow." "These markings must have been accidental stains, as the eggs of the whole genus are white."—*Mr. Doubleday.*

SPOTTED WOODPECKER, *Picus major.*

Situation. In the trunk of a tree: the bird invariably plasters up with clay the hole in the tree in which the nest is built, only leaving a round hole just large enough to permit the passing of the bird.

Materials. The particles of wood chipped off by the bird.

Eggs, 4, 5. White, beautifully and delicately tinged with blue.

LESSER SPOTTED WOODPECKER, *Picus minor.*

Situation. A hole in the trunk of a tree, so small at the entrance that a larger bird cannot enter; chiefly in Herefordshire, Worcestershire and Gloucestershire.

Materials. Comminuted decayed wood.

Eggs, 5—7. White, tinged with pink.

WRYNECK, *Yunx torquilla.*

Situation. Holes in the trunks of trees; the hole sometimes lined with moss and feathers.

Materials. Comminuted decayed wood.

Eggs, 5—7. Pure white.

CREEPER, *Certhia familiaris.*

Situation. The hole of a tree.

Materials. Fine hay: Mr. Selby says also the inner bark of trees.

Eggs, 6. White, speckled with red-brown.

WREN, *Troglodytes europæus.*

Situation. Under the thatch of stables, outhouses, summer-houses, on the face of rocks, either exposed or clothed with ivy, on the ivy-clothed trunks of trees: the nest is completely domed, and has a small entrance-hole near the top. This little bird has credit for building a number of supplementary nests, for no other purpose except to roost in: it is certain a great many more nests are built than are required for purposes of incubation: such supplementary nests are always without lining, and are commonly called "cock's nests," and Mr. Duncan asserts (Zool. 382) that they are built by the male birds.

Materials. Principally moss and lichens, lined with feathers: always of the same colour as the substance to which it is attached.

Eggs, 6. White, tinged with yellow, and speckled at the larger end with red-brown.

NUTHATCH, *Sitta europæa*.

Situation. The hole of a decaying tree, especially apple trees: this bird invariably plasters up the hole with clay, leaving a small round opening.

Materials. The dried dead leaves of oak, apple, elm, &c., very carelessly arranged.

Eggs, 5—7. Pure white, spotted with red-brown, and not easily distinguished from those of the great titmouse, but they are generally larger. "During incubation the female sits very close, and it is almost impossible to drive her from the nest; she defends it to the last extremity, striking with her beak and wings, and making at the same time a hissing noise."—*Mr. Selby*.

CUCKOO, *Cuculus canorus*.

Situation and Materials. The cuckoo makes no nest, but lays its eggs in the nests of other birds, particularly of the pied wagtail, meadow pipit, yellowhammer and hedgesparrow. See a most interesting account of a young cuckoo by Col. Newman: it was found in a hedgesparrow's nest, removed with the nest into a wicker cage, and there tended by the hedgesparrows (Zool. 3424).

Egg, 1, in a nest. Reddish gray, with a darker zone formed of very numerous confluent spots at the largest part; very variable.

KINGFISHER, *Alcedo hispidæ*.

Situation. A hole in a river-bank, generally three or four feet above the usual surface of the water: the hole excavated by the sand martin is often adopted.

Materials. The bones of fishes and nothing else (see Zool. 3578).

Eggs, 6, 7. Nearly round, white and shining: when quite fresh from the nest and unblown the yolk shows through the shell, and gives a beautiful salmon-colour to the egg.

SWALLOW, *Hirundo rustica*.

Situation. In chimneys and under eaves of houses, outhouses, churches and stables. Some very excellent observers have stated that swallows do not commonly build in chimneys (see Zool. 147, 354, &c.); but this is certainly the general rule: how they can approve of such a smoky atmosphere is a problem I am unable to solve.

Materials. Mud or clay mixed with straw and hay, and lined with feathers: a rather large, loosely-built nest, always open at top: it

has none of the neatness for which the nest of the following species is so remarkable.

Eggs, 4, 5. White speckled with brown, generally forming a distinct zone at the larger end; the only British species of the family that has speckled eggs.

MARTIN, *Hirundo urbica*.

Situation. Under eaves of houses, string-courses, and other projections in churches, arches of bridges, upper angles of windows, face of chalk-pits, rocks and sea-cliffs.

Materials. Mud, neatly welded together, and forming a compact domicile, enclosed on all sides excepting a circular hole just large enough to admit the passage of the birds within the mud habitation; internally lined with straw, hay and feathers.

Eggs, 5, 6. White, tinged with pink, unspotted.

SAND MARTIN, *Hirundo riparia*.

Situation. At the extremity of deep holes, excavated by the bird itself, in sand-banks.

Materials. Hay, straw, feathers.

Eggs, 4, 5. White, unspotted.

SWIFT, *Cypselus apus*.

Situation. Holes in the towers and steeples of churches, sometimes under the eaves of inhabited houses.

Materials. Hay, straw, feathers collected while descending. "These materials are cemented together, and the inside of the nest is plastered with a viscid substance furnished by glands peculiar to certain birds of this genus."—*Mr. Selby*. I have no knowledge of the substance or glands alluded to by this eminent ornithologist.

Eggs, 2. White, unspotted.

NIGHTJAR, *Caprimulgus europæus*.

Situation. On the ground, on sandy heaths, particularly under shelter of the common brachen (*Eupteris aquilina*).

Materials. None.

Eggs, 2. Gray, spotted and marbled with dark brown and gray, very glossy. "The female, when sitting upon her eggs or young, squats so close and flat, besides remaining motionless, and her colours harmonize so well with the surrounding surface of the ground, that she is not readily seen, unless you happen to catch sight of her large lustrous dark eye; indeed, when the young are hatched she will almost let you tread on her before she attempts to rise."—*Zool.* 3654.

This bird is the cuckoo of those juvenile naturalists who write and

speak of the cuckoo incubating her own eggs and rearing her own young: I believe Mr. Selby was the first author who explained away these strange mis-statements.

RING DOVE, *Columba Palumbus*.

Situation. In fir trees, yew trees and ivy-clothed trees, also in ivy covering the surface of rocks. "Hundreds of nests are built in Epping Forest every year, in the branches of the pollard hornbeams and in oaks; and also in the pollard elms in hedge-rows."—*Mr. Doubleday*. "I have found many nests in the New Forest in old whitethorns."—*Mr. Bond*. "A ring dove had fixed her nest in a low furze-bush growing upon the slope of a considerable clay bank. The twigs with which the nest was formed were in some places curiously interwoven with the branches of the bush."—*Mr. Duncan*. Mr. Edward relates (*Zool.* 2644) that he found a ring dove's nest on the ground.

Materials. Sticks and twigs laid together in a loose and careful manner. I have often seen the eggs through the bottom of the nest.

Eggs, 2, white. The young of this species, and perhaps of the other doves, are fed with half-digested matter ejected from the crops of the parents. "In my morning rambles, last spring, I discovered a nest of a ring dove in a young Scotch fir, containing three eggs, one of them much less than the other two."—*Mr. Walmsley* (*Zool.* 222).

STOCK DOVE, *Columba Ænas*.

Situation. Cavities in the trunks of trees in Richmond Park, and elsewhere in the South and East of England, as Hertfordshire, Norfolk, Suffolk, Essex, Kent, Sussex and Surrey: also in rabbit-burrows. "The stock dove occupies the deserted rabbit-burrows upon warrens; it places its pair of eggs about a yard from the entrance, generally upon the bare sand, sometimes using a small quantity of dried roots, &c., barely sufficient to keep the eggs from the ground: besides such situations on the heaths, it nestles under thick furze-bushes which are impervious to rain, in consequence of the sheep and rabbits eating off the young and tender shoots as they grow; the birds always preferring those bushes that have a small opening, made by the rabbits, near the ground."—*Mr. Salmon*.

Materials. Sticks and roots.

Eggs, 2. White and shining.

ROCK DOVE, *Columba Livia*.

Situation. Fissures and ledges of sea-cliffs: I have observed this bird breeding at Oban in Argyleshire, in the Isle of Mull, and other places on the west coast of Ireland.

Materials. Sticks and heath.

Eggs, 2. White.

TURTLE DOVE, *Columba Turtur*.

Situation. In very thick woods in the south-eastern counties of England, more especially Kent.

Materials. Twigs and sticks carelessly laid together.

Eggs, 2. White, very small compared with those of the ring dove and stock dove.

PHEASANT, *Phasianus colchicus*.

Situation. On the ground, amidst coarse grass and weeds, or in the scrub on the outskirts of woods: this bird is polygamous. Mr. Newton mentions (Zool. 4070) an instance of a pheasant occupying the dray of a squirrel in a Scotch fir: she hatched but did not rear her young; they were found dead in the nest.

Materials. Scarcely any, beyond the dried grasses among which it is placed.

Eggs, 8—13. Pale olive-green, unspotted.

CAPERCALLY, *Tetrao Urogallus*.

Situation. This bird was formerly abundant in Scotland, then became extinct, was reintroduced in 1838 on the domain of the Marquis of Breadalbane, and is now increasing.

Materials. Sticks and ling.

Eggs, 6—12. Pale red-brown, spotted and blotched with two shades of darker brown. "In 1829 I saw nine eggs of the capercally which were sent over from Norway to Lord Fife, to be hatched at Marr Lodge, Braemar. They were completely different in appearance from any other eggs of this interesting bird that have come under my notice. They were without any spots, and of a deep brown colour, with some scarcely perceptible yellow blotches."—*Rev. James Smith* (Zool. 2989). "All the eggs I have seen are exactly like those of the black grouse, except in size."—*Mr. Bond*.

BLACK GROUSE, *Tetrao Tetrix*.

Situation. On the ground on wild mountain heaths, particularly in wet or marshy places, where sundew is found: this bird is polygamous.

Materials. Ling, heath, grass; always sheltered by a tussock of coarse grass, a furze-bush or a bush of ling.

Eggs, 6—10. Gray, tinged with yellow-red, blotched with red-brown.

RED GROUSE, *Tetrao scoticus*.

Situation. On mountain wilds in Scotland, North of England, Herefordshire, South Wales and Ireland. The Herefordshire habitat,

known as the Black Mountain district, although so well known to the sportsmen in the neighbourhood, seems to have escaped the notice of naturalists.

Materials. Ling, heath, bents, very little of either, the bird scratching a hole in which to lay her eggs. The hen bird only incubates, the cock remaining in the neighbourhood, and flying short distances before the intruder, to lead him away from the nest: as soon as the young come forth the cock and hen are equally assiduous in taking care of them.

Eggs, 7—13. Gray, sometimes white, blotched with umber-brown.

PTARMIGAN, *Tetrao Lagopus.*

Situation. On the ground on the stony mountain tops of Scotland and adjacent islands.

Materials. None: the hen scratches the ground, and lays her eggs in the cavity thus formed.

Eggs, 7—15. Pale-red brown, blotched with two shades of darker brown.

PARTRIDGE, *Perdix cinerea.*

Situation. On the ground, in corn fields, standing grass, among weeds, &c., throughout all arable districts.

Materials. Nothing more than the stems of the corn-weeds growing in such places, scratched and trampled down.

Eggs, 10—20. Pale yellow-brown, unspotted: they are usually hatched about Midsummer Day, not the middle of July, as stated by most authors.

REDLEGGED PARTRIDGE, *Perdix rubra.*

Situation. On the ground in clover and corn fields in the eastern counties, particularly Norfolk and Suffolk. Mr. Newton mentions (Zool. 4073) an instance of a bird of this species building a nest and sitting on thirteen eggs on the thatch of a stack of barley.

Materials. Dried leaves, in addition to the crop, whatever it may be, in which the bird chooses its site.

Eggs, 12—18. Yellow-gray, spotted with red-brown.

QUAIL, *Perdix Coturnix.*

Situation. Generally in corn fields, among green corn.

Materials. None, unless the trodden and scratched blades of growing corn can be thus called.

Eggs, 12—20. Pale yellowish brown, speckled, spotted or blotched with brown.

STONE CURLEW, *Ædicnemus crepitans*.

Situation. On the ground, especially in the south-eastern counties of England.

Materials. Sometimes a very few bents and small straws.

Eggs, 2, 3. Testaceous-brown, blotched, spotted and streaked with lead-colour and umber-brown: pairs of eggs have often been found in the stony fallows at Aperfield, near Cudham, in Kent.

GOLDEN PLOVER, *Charadrius pluvialis*.

Situation. On mountain wilds and bogs in Scotland, the North of England, and Ireland.

Materials. Scarcely any, a few fragments of heather and dried grasses carelessly scraped together.

Eggs, 4. Cream-coloured, with large blotches of umber-brown of various shapes and sizes. The young bird is covered with down of two colours: it runs as soon as hatched.

DOTTERELL, *Charadrius morinellus*.

Situation. Summits of mountains in the North of England, "particularly those that are densely covered with the woolly fringe-moss (*Trichostomum lanuginosum*), which indeed grows more or less profusely on nearly all the most elevated parts of this alpine district."—*Mr. Heysham.* The particular hills on which the dotterell feeds are Helvellyn, Whiteside, Whatson Dod, Saddleback, Skiddaw, Carrick Fell, Grasmoor, Robinson, Gold Scalp and Great Gavel, on the Cumberland ranges; also Hoy in Orkney, and several localities in the Orkney Islands.

Materials. None: "they lay their eggs in a small cavity on dry ground covered with vegetation, and generally near a moderate-sized stone or fragment of rock."—*Mr. Heysham.*

Eggs, 3. Dark cream-colour or olive-brown, thickly blotched with dark brown or black.

RINGED PLOVER, *Charadrius hiaticula*.

Situation. On the sea-coast, among gravel or on sand near high-water mark. "Sometimes also on the links or sand-hills that line the coast, or even in a corn field, if immediately adjoining the shore."—*Mr. Selby.*

Materials. Dried grasses, and a very small quantity of them. "Often, perhaps generally, lined, or more properly speaking paved, with small white stones, looking something like tessellated pavement; which not unfrequently remains perfect for a year or two after the young birds have left."—*Mr. Bond.*

Eggs, 4. Pale stone-colour, marked all over with small black and

ash-coloured spots; they are invariably placed with the smaller ends together in the middle, thus occupying the least possible space. "In the spring of 1844, while staying on the Sussex coast, I found two nests of this bird, each with four eggs: I visited them at noon every day for nearly a week; I invariably found the bird on the nest, although the weather was very hot at the time. The parent bird, when disturbed, creeps along the shingle to the water's edge, and then flies a short distance, uttering its well-known cry."—*Mr. Channell* (Zool. 1202). It is said that the ringed plover exposes her eggs to the sun's rays at noon: I think the preceding quotation shows the fallacy of this assertion.

KENTISH PLOVER, *Charadrius cantianus*.

Situation. On sand by the sea-coast of Kent and Sussex.

Materials. It makes no nest, but lays its eggs in a depression of the sand, and about the banks of shells which abound in some localities on the beach.

Eggs, 4. Pale testaceous-brown, spotted and streaked with black.

LAPWING, *Vanellus cristatus*.

Situation. On all waste grounds, whether upland or low marshes.

Materials. It makes a depression on the surface, lined with straws and bents.

Eggs, 4. Dark olive-brown, blotched with black-brown. May be bought in any quantities in the London markets, to which they are brought as articles of luxury. The eggs of rarer birds often occur amongst them, but it requires a perfect knowledge of eggs to fix on the species to which such accidentally-obtained eggs belong.

OYSTERCATCHER, *Hematopus ostralegus*.

Situation. On the bare ground on our sea-coasts, especially of Lincolnshire.

Materials. A few bents and small stones regularly arranged.

Eggs, 3, 4. Stone-colour, blotched with dark brown and gray: sometimes streaked: they are invariably placed with the smaller ends in the middle.

HERON, *Ardea cinerea*.

Situation. The tops of high trees, almost invariably in societies called heronries, in one station only (in Pembrokeshire), on cliffs facing the sea.

Materials. Sticks in large quantities, the interior lined with wool and sometimes rags.

Eggs, 4, 5. Pale greenish brown.

BITTERN, *Ardea stellaris*.

Situation. On the ground in marshy places, always near the water's edge, amongst dense masses and clusters of reeds and flags.

Materials. A few sticks, with abundance of dead reeds, flag-leaves and Carices.

Eggs, 4, 5. Pale greenish brown.

CURLEW, *Numenius arquata*.

Situation. On the ground, generally sheltered by heath, ling, or clumps of *Carex* or rush, in a cavity scraped out by the parent.

Materials. Dried heather, rushes or Carices.

Eggs, 4, the points meeting in the centre, pale olive-green, blotched with brown of two shades. The young, which run as soon as hatched, are covered with down, and do not possess the long curved beak of the parents.

WHIMBREL, *Numenius phæopus*.

Situation. On the ground in exposed heathy districts, on the Grampians, in Scotland, in the Orkney Islands, Shetland Islands, &c.

Materials. Dried heather and grass.

Eggs, 4. Dark olive-green, blotched with dark umber-brown.

REDSHANK, *Totanus calidris*.

Situation. On the summit of a tussock of grass or *Carex*, or on the ground in moist meadows.

Materials. Fine dried grass, in small quantities.

Eggs, 4. "Egg pale yellowish straw-colour, the dark spots often forming a zone at the larger end."—*Mr. Doubleday*.

COMMON SANDPIPER, *Totanus hypoleucos*.

Situation. "It breeds upon the banks of rivers or lakes, taking care to make its nest beyond the reach of the usual floods; and frequently, should a corn field approach the edge of the water, it will retire within it. The immediate site of the nest is generally under a projecting tuft of grass or rush, where it scrapes rather a deep hole in the ground."—*Mr. Selby*.

Materials. The deep hole mentioned by *Mr. Selby* is lined with fine dried grass and leaves.

Eggs, 4. "The eggs are four in number, and not five, as stated by some authors; they are of a cream-yellow colour, with numerous spots of dark brown upon the surface, and others of a lighter hue appearing as it were underneath the outer shell."—*Mr. Selby*.

This elegant little bird is called the snipe and summer snipe, and is the species to which all the stories of snipes settling on rails, gates,

&c., may be unhesitatingly referred. This very excusable mistake has occasioned a rather acrimonious and most amusing controversy in that excellent sporting newspaper 'The Field.'

GREENSHANK, *Totanus glottis*.

Situation. "I once found a nest of this bird in the island of Harris; it was at a considerable distance from the water."—*Mr. Macgillivray*.

Materials. * * * "and consisted of a few fragments of heath and grass, placed in a hollow cavity scraped in the turf in an exposed place: the nest in fact resembled that of the golden plover, the curlew or the lapwing."—*Mr. Macgillivray*.

Eggs, 4. "The eggs, placed with their narrow ends together, were four in number, pyriform, larger than those of the lapwing and smaller than those of the golden plover, equally pointed with the latter, but proportionally broader and more rounded at the larger end than either. The dimensions of one of them were two inches exactly, by one inch and three-eighths: the ground-colour is a very pale yellowish green, sprinkled all over with irregular spots of dark brown, intermixed with blotches of light purplish gray, the spots and especially the blotches more numerous at the larger end."—*Mr. Macgillivray*. "The egg is larger than that of the redshank by six lines in length and four in breadth: it is of a pale greenish white colour, blotched and spotted with ferruginous and dull red, chiefly at the larger end."—*Sir Wm. Milner* (*Zool.* 2016). *Sir W. M. E. Milner* states (*Zool.* 2230) that he subsequently had three eggs sent him from the same locality, like the first in size but considerably more coloured, being nearly the same colour as the peewit's, but very different in shape, being pyriform. "Very variable in ground-colour; some are cream-coloured."—*Mr. Bond*.

AVOCET, *Recurvirostra Avocetta*.

Situation. *Col. Montagu* says that this beautiful bird breeds in the fens of Lincolnshire, and also in Romney Marsh: whatever may have been the case formerly, it certainly does so no longer.

Materials. None are mentioned.

Eggs, 2, 3. "It lays two eggs, about the size of those of a pigeon; white, tinged with green and marked with large black spots."—*Col. Montagu*. "The nest is said to be made in a small hole in the drier parts of extensive marshes: the eggs are said to be only two in number, of a clay-coloured brown, spotted and speckled with black, about two inches in length, by one inch and a half in breadth."—*Mr.*

Yarrell. "Colonel Montagu never could have seen the eggs of the avocet; they are as large as those of the peewit."—*Mr. Bond.*

BLACKTAILED GODWIT, *Limosa melanura.*

Situation. A few pairs of this bird breed in the fenny districts of Lincolnshire, Cambridgeshire and Norfolk, making their nest in thick herbage, and always near water.

Materials. "The nest is composed of dry grass and other vegetables, and is concealed among coarse herbage of the swamps and low meadows."—*Mr. Yarrell.*

Eggs, 4. Deep olive-green colour, faintly blotched with spots of a darker shade.

RUFF. *Machetes pugnax.*

Situation. "The nest is usually formed upon a lump in moist swampy places, surrounded by coarse grass."—*Col. Montagu.*

Materials. None brought to the spot, the coarse grass growing there being the only substance used.

Eggs, 4. "The eggs are, as usual with its congeners, four in number; these are so nearly similar to those of the snipe and redshank, both of which breed in the same wet places, and make similar nests, that some experience is required to discriminate them: they are, however, superior in size to the former, and are known from the latter by the ground being of a greenish hue instead of rufous-white; but individuals assimilate so nearly to each other as not to be distinguished, especially as the dusky and brown spots and blotches are similar."—*Col. Montagu.*

WOODCOCK, *Scolopax Rusticola.*

Situation. In underwood at the foot of a tree: the bird generally scrapes out a slight hole in the ground, and without much attempt at concealment.

Materials. Dead leaves and dried fronds of the common brake (*Eupteris aquilina*).

Eggs, 4. Yellow-white, blotched with pale chestnut-brown.

The woodcock frequently but not habitually nests in this country: this occurrence seems accidental and exceptional: the eggs are very rarely found, the young more frequently: the young ones run as soon as hatched, and the old birds are most assiduous in caring for them, often transporting them from place to place with their feet. For instances of the woodcock breeding in England almost every volume of the 'Zoologist' may be consulted.

COMMON SNIPE, *Scolopax Gallinago.*

Situation. On the ground on the elevated moors of the North of

England and highlands of Scotland, and usually under a tuft of sedge or grass.

Materials. The snipe makes a slight depression in the earth, and lines it with withered grass and dried heather.

Eggs, 3, 4. Gray, tinged with yellow or olive-green, and blotched with umber-brown of two shades: they are invariably placed with the small ends together in the middle. The great mass of snipes frequenting this country in the winter leave us in the spring and breed in the North of Europe. "The eggs of this bird are very variable in ground-colour; sometimes dark olive-brown, sometimes dark cream or stone-colour."—*Mr. Bond.*

DUNLIN, *Tringa variabilis.*

Situation. On the sea-beach, among shingle at the mouth of rivers in Scotland; sometimes also in salt-marshes, and very rarely in mountain bogs.

Materials. A few straws or bents.

Eggs, 4. Of an olive-green or green-gray colour, blotched all over with umber-brown. "Very variable in ground-colour; pale olive-green and cream-colour of various shades."—*Mr. Bond.*

LANDRAIL, *Gallinula Crex.*

Situation. On the ground in meadows and underwood, sometimes in fields of standing corn, generally making a slight cavity.

Materials. Grass, sometimes leaves.

Eggs, 10—15. Dingy white, tinged with rosy pink, and freckled and spotted with red-brown: the young are covered with silky brown down, and run as soon as hatched.

SPOTTED CRAKE, *Gallinula porzana.*

Situation. On the ground in bogs and marshes, generally in the water, that is, so placed that the water permeates the lower part of the nest.

Materials. Flags, sedges, reeds, rushes, sometimes Potamogetons, often forming a very large mass, apparently disproportioned to the size of the bird, but having a cup-shaped depression in the middle, dry, and neatly lined with the same materials only finer.

Eggs, 8—10. Gray, tinged with pink, and spotted with umber-brown of two shades. "The young take the water as soon as hatched."—*Col. Montagu.* "They are of a dark bottle-green colour."—*Mr. Bond.*

MOORHEN, *Gallinula chloropus.*

Situation. I have taken great interest in observing the nesting places of this common and familiar bird, which lives with us, like the

pheasant, in a semi-domestic state, seeming to prefer the companionship of man with all its dangers. I have seen the moorhen's nest high up in a Spruce fir, resting on lateral branches, sometimes close to the bole, and sometimes so near the end as to swing with every breeze; then I have found it on the long horizontal boughs of willows that actually dipped the water and floated on the surface; again on the top of a pollard willow; again on the summit of a tussock of *Carex* or *Aira cæspitosa*, and very often indeed among the sedges on the banks of streams and ponds.

Materials. The nest is formed of a huge mass of flags and reeds matted and woven and sodden together.

Eggs, 8—10. Pale testaceous-brown, spotted with testaceous-brown and umber-brown. When the bird leaves the nest she covers the eggs with flags and reeds: the young, which are covered with black hairy down, take to the water immediately on leaving the egg-shell.

WATER RAIL, *Rallus aquaticus*.

Situation. Under thick cover in osier-beds, and swamps in which alders grow, more especially in the South of England.

Materials. Sedges and flags in considerable quantities.

Eggs, 6—9. "Of a spotless white and very smooth, rather larger than those of a blackbird; the shape a short oval, with both ends nearly alike."—*Col. Montagu*. "Cream-coloured white, with small specks of ash-gray and reddish brown."—*Mr. Yarrell*. Temminck says the eggs vary from 10 to 12 in number, and are yellow-white, spotted with red-brown. Mr. Hewitson figures something answering this description. "The eggs are well known. I have seen the nest *in situ* at Whittlesea Mere: Hewitson's figure is quite correct: I think Montagu's nest must have belonged to some other bird. I have seen scores of eggs—not a pure white one among them—always creamy white, with more or less small reddish dots and spots. I have the young, which is dark bottle-green, similar to the young of the moorhen, spotted crake and Baillon's crake: I have the very young of all these species now before me: not one is really black."—*Mr. Bond*.

COOT, *Fulica atra*.

Situation. In marshes and ponds.

Materials. Decaying reeds, flags, sedges and rushes. "I have examined many of their nests: they are large, and, at first sight, apparently clumsy, but are amazingly strong and compactly put together; they are sometimes built on a tuft of rushes, but more commonly among reeds: some are supported by those that lie prostrate in the

water, whilst others have their foundations at the bottom, and are raised till they become from six to twelve inches above its surface sometimes in a depth of one and a half to two feet of water.”—*Mr. Hewitson*. The nests are frequently washed from their foundations by floods, and then float on the surface of the water, and are driven by the wind to the shore; the hen bird, if incubating at the time, exhibits no disapprobation of this change of position, but continues assiduously to perform her parental duties.

Eggs, 7—10. Gray, tinged with green, speckled and spotted with brown, the spots very few, less-numerous and darker than the speckles. “The young, when excluded, are clothed with a patch of black down, tipped with gray; having the base of the beak and forehead covered with small scarlet appendages, and the occiput surrounded with a circle of yellow hairy down.”—*Mr. Selby*. “I think the young of the coot has more red and yellow on the neck and back than in *Mr. Selby’s* description: the body is sooty black.”—*Mr. Bond*.

REDNECKED PHALAROPE, *Phalaropus hyperboreus*.

Situation. Breeds in the Orkney Islands, and always near the sea. “The nests were placed in small tufts of grass growing close to the edge of the loch: they were formed of dried grass, and were about the size of that of a titlark, but much deeper. The eggs are considerably smaller than those of the dunlin, and are beautifully spotted all over with brown.”—*Mr. Salmon*.

Materials. Grasses and sedges.

Eggs, 4. Olive-green, with appropriate black spots.

GRAYLAG GOOSE, *Anser ferus*.

Situation. “It breeds amongst rushes and other coarse herbage, making a large nest of vegetable matter, and laying from six to twelve eggs of sullied white.”—*Mr. Selby*. “On Loch Maddie we saw a few pairs of the graylag goose, and found one egg which is rather smaller than that of the bean goose, and more pointed at the smaller end.”—*Sir William Milner* (Zool. 2015).

BEAN GOOSE, *Anser Segetum*.

Situation. “This bird, which I take to be the common wild goose, certainly breeds in the western islands of Scotland, and also in the Highland lochs of Scotland, always in the vicinity of water.” *Sir W. M. E. Milner* has favoured me with the following note:—“Upon Loch Laighall, in Sutherlandshire, we found several pairs of the bean goose breeding, and procured their eggs, which are smaller than those of the common goose, but of a similar shape and colour. They generally lay from six to eight eggs, but are so constantly robbed that they

are leaving Loch Laighall, and are betaking themselves to the islands on the smaller lakes, which from their situation are inaccessible to man, as no boat can be brought to them. After their nests have been robbed they never lay again."—*Zool.* 2014.

Materials. Sedges, flags, rushes, grasses, generally in large masses.
Eggs, 8—12. White.

COMMON SHIELDRAKE, *Anas tadorna*.

Situation. This bird occasionally, perhaps frequently, breeds in this country, selecting those parts of the sea-shore which, in the North of England and in Scotland, are so frequently honeycombed by rabbits; these excavations they enlarge, and often place their nest ten or twelve feet from the entrance.

Materials. Dried flags, sedges, reeds, &c., for the exterior; the lining always composed of down plucked from their own bodies.

Eggs, 10—12. Of a roundish oblong form, having a very smooth shell and being cream-coloured.

SHOVELLER, *Anas clypeata*.

Situation. This bird is said to breed in Norfolk, Lincolnshire, Cambridgeshire and Scotland: it always selects that part of marshes farthest removed from the observation of man.

Materials. Flags, sedges, reeds.

Eggs, 8—12. White, manifestly tinged with green.

WILD DUCK, *Anas Boschas*.

Situation. In some spot in the marshes rather drier and more elevated than the surrounding flat, but sufficiently near to the water for the hen bird to lead her ducklings to the water immediately on being hatched. There are, however, many exceptions to this usual site of the duck's nest, and we occasionally find them building on pollard willows, or occupying a deserted crow's nest in a tree, and even on church-towers: the problem "how does the duck, breeding in such situations, convey its ducklings to the water?" has been discussed in the pages of the 'Zoologist' with much eagerness and a good deal of talent: it has been contended that she carries them one by one in her feet, in her beak, under her beak, &c.; and several writers have insisted, certainly contrary to fact, that these elevated nests are always so placed that the ducklings, when hatched, may fall at once into the water: the subject is one which still requires the most careful observation: as a simple fact this habit of wild ducks is perfectly familiar to the inhabitants of Lapland, "in which country cylinders of wood stopped at both ends, and having a hole in the side, are elevated on poles, purposely to entice wild ducks to

build in them: these birds are not slow to avail themselves of this accommodation, and the Laplanders thus reap a harvest of duck's eggs. The hawk-owl, however, often dispossesses the duck, appropriates the cylinders, and pays a felon's penalty to the owner."—*Linnæus*. These observations refer perhaps more especially to the goldeneye; but several species have the same or a similar taste in nidification.

TEAL, *Anas Crecca*.

Situation. Marshes in Scotland and the North of England, very rarely in the South, particularly selecting sites in which rushes are abundant.

Materials. Large quantities of dried or decaying flags, sedges and other water plants, lined with feathers.

Eggs, 8—10. White, without any tinge of blue.

EIDER DUCK, *Anas mollissima*.

Situation. On the ground on the coast of Northumberland, the Fern Islands, Coquet Islands, Western Islands of Scotland, &c. Mr. Selby, who has repeatedly visited the Fern Islands for the purpose of studying these birds, gives the following account of them:—"About April they are seen assembling in small groups along the shores of the mainland, from whence they cross over to the Islands in May, soon after which the females begin to prepare their nests, and they usually commence laying about the 20th of that month. The males, as soon as this takes place and incubation commences, leave the females, and again spread themselves along the shore, in companies of four or five together."

Materials. "The nest is composed of dried grasses mixed with a quantity of the smaller Algæ, and as incubation proceeds (and which lasts for a month) a lining of down, plucked by the bird from her own body, is added. This addition is made daily, and at last becomes so considerable a mass as to envelope and entirely conceal the eggs."—*Mr. Selby*.

Eggs, 5. "The usual number of eggs is five, of a pale asparagus-green colour, of an oblong shape, and not much less than those of a goose. * * The young, as soon as hatched, are conducted to the water, which in some instances must be effected by the parent conveying them in her bill, as I have often seen the nest in such situations as to preclude the possibility of their arriving at it in any other way, and indeed the keeper of one of the lighthouses assured me that he had seen the bird engaged in this interesting duty."—*Mr. Selby*.

REDBREASTED MERGANSER, *Mergus Serrator*.

Situation. On the ground on the borders of lakes, or on lake-islands in Scotland, especially Loch Awe: the nest is a few yards above the highest water line, "frequently," says Mr. Selby, "beside a large stone covered with brambles and coarse herbage, or under the shelter of some thick bush."

Materials. Dried grasses and rushes, and fibrous roots with abundance of the bird's feathers and down, the last increased in quantity as incubation advances.

Eggs, 7—11. White or cream-colour, tinged with brown.

GOOSANDER, *Mergus Merganser*.

Situation. Mr. John Macgillivray says that the goosander breeds in the outer Hebrides, on the borders of lakes, and sometimes on the sea-coast: he mentions Loch Maddie, in North Uist. Mr. Low also says it breeds in the Orkneys.

Materials. "The nest is constructed of a mass of grass, roots and other materials, mixed and lined with down."—*Mr. Selby.*

Eggs, 12—15. Cream-coloured, equally blunt at both ends.

GREAT CRESTED GREBE (OR LOON), *Podiceps cristatus*.

Situation. Floating on the water of fresh-water lakes or ponds, especially amongst reeds, in the eastern and northern counties of England, particularly Norfolk, Lincolnshire and Cheshire.

Materials. It collects an enormous quantity of flags, reeds, and Mr. Selby says the stems of the water-lily.

Eggs, 3, 4. White, tinged with green.

EARED GREBE, *Podiceps auritus*.

Situation. Floating on the surface of water in the fens of Lincolnshire.

Materials. Flags and other aquatic plants.

Eggs, 4, 5. Little or nothing is known of the breeding of this bird in Britain. Col. Montagu mentions the foregoing facts.

LITTLE GREBE, *Podiceps minor*.

Situation. Floating on the surface of the water of ponds.

Materials. Decayed flags, reeds, Potamogetons, &c., forming immense masses.

Eggs, 5, 6. At first white, by degrees becoming dingy and dirty, as if stained by the decaying flags: the female, on leaving the nest, covers the eggs with flags, &c., to conceal them.

REDTHROATED DIVER, *Colymbus septentrionalis*.

Situation. Mr. Low says that it breeds in the Orkney Islands, in a lake among the hills of the Isle of Hoy, and that the nest is so

situated that the bird can step from the nest into the water. "Between Tongue and Altrehara, on the 20th May, we procured a fine specimen of the redthroated diver on a small pool near the road-side. A single egg was deposited close to the water's edge, and on skinning the bird a second egg was found ready for extrusion."—*Sir William Milner* (Zool. 2014).

Materials. It is formed of moss and the stems of aquatic plants.

Eggs, 2. Olive-green, with black spots.

GUILLEMOT, *Uria troile*.

Situation. On the ledges of sea-cliffs in a great number of stations all around our coasts. I may particularly mention Beachy Head. "Here the egg-collectors frequently obtain twelve or fourteen dozen of guillemot's eggs of a morning, and sell them readily at sixpence each. These men are lowered down the cliff by means of a derrick, which is simply a thick pole, with a wheel in one end of it for the rope to run over, and protruding about two feet from the edge of the cliff: through the other end of the pole a hole is bored, and through this an iron bar is driven firmly into the ground to keep it steady."—*Zool.* 1193. See also 'Letters of Rusticus.'

Materials. None: the bird makes no attempt at nest-building, but lays its eggs on the bare rock.

Egg 1. Very large, and disproportionately large at one end, the other end tapering; ground-colour bright green or dirty white, blotched with black or black-brown. The young, when hatched, are thickly covered with down, dark above and light beneath: they remain on the rock for some weeks.

BRUNNICH'S GUILLEMOT, *Uria Brunnichii*.

Situation. On sea-cliffs in the Island of Soa, one of the St. Kilda group.

Materials. None.

Egg, 1. "Bright green, not spotted or blotched, but streaked."—*Sir W. Milner*.

RINGED GUILLEMOT, *Uria lacrymans*.

Situation. Sea-cliffs at Borrera, one of the St. Kilda group.

Materials. None.

Egg, 1. "Bright green, covered with irregular lines of brownish black."—*Sir W. Milner*. The late Mr. John Wolley, whose untimely loss all ornithologists sincerely deplore, expressed (*Zool.* 3477) a very strong opinion that this bird is not distinct from the common guillemot; and I know of no one more capable of forming a sound judgment on such a point.

BLACK GUILLEMOT, *Uria grylle.*

Situation. On sea-cliffs in Orkney, Shetland and St. Kilda; also, in very small numbers, in the Isle of May, in the Firth of Forth.

Materials. None whatever, its egg being laid on the bare rock.

Egg 1. Gray, speckled with black and ashy gray.

PUFFIN, *Mormon fratercula.*

Situation. It burrows in the ground, or adopts as its own the burrows of rabbits, in the immediate neighbourhood of the sea. Pembleton Island, near Anglesea, Isle of Man, Isle of Wight, &c. : it also frequently breeds in fissures of sea-cliffs: see especially, on this point, the 'Letters of Rusticus,' and a paper 'On Sea-fowls Breeding in Moray Firth,' by the Rev. James Smith (Zool. 2905). Mr. Smith says that the fissures in which these birds breed are very narrow and frequently long. "They extend a considerable way into the rock, and are generally horizontal, but occasionally vertical. Especial care seems to be taken by the bird against all such among them as may be liable to be reached by the waves, even when the tide is at the very highest. There is in this case but little appearance of a nest; but, when incubation is well advanced, a few grasses will be usually observed intermixed with a sprinkling of feathers from the bird. In such fissures as these the nest can only be reached by means of a stick. The bird sits very closely and determinedly upon it; will not be induced to quit it except by force, and with its singularly constructed and formidable beak bites most severely in its defence."

Materials. None, the egg being placed on the bare earth at the extremity of the burrow.

Egg, 1. Gray, with a dingy tinge and a few brown specks.

RAZORBILL, *Alca torda.*

Situation. On sea-cliffs; sometimes in holes.

Materials. None.

Egg, 1. Generally gray, blotched with black or brown.

CORMORANT, *Carbo cormoranus.*

Situation. The ledges of sea-cliffs, Freshwater Cliff, Isle of Wight, and many other localities.

Materials. Sticks and dead sea-weeds.

Eggs, 5. Whitish, tinged with green. The young are born blind and naked, but soon acquire a clothing of black down: they are six weeks before they can leave the nest. I have seen them in all stages on the face of the cliff at Freshwater by lying down and looking over from the summit: the smell from these birds, while nesting, is exceedingly offensive.

SHAG, *Carbo cristatus*.

Situation. Ledges and apertures on the face of sea-cliffs. I have never seen it, and believe it is confined to a few localities in the islands north-west of Scotland.

Materials. "The nest is formed of a considerable quantity of sea-weed, lined with the finer species and dried grass."—*Mr. Hewitson*.

Eggs, 4, 5. "The eggs, like those of the cormorant, are outwardly of a soft chalky substance, which is easily scraped off, leaving a hard greenish shell beneath. When fresh-laid they are white, but soon become daubed and stained all over, like the eggs of the grebe, by the materials of which the nest is formed."—*Mr. Hewitson*.

GANNET, *Sula bassana*.

Situation. On rocks, as Ailsa Craig in the Firth of Clyde, the Island of St. Kilda, the Bass Rock in the Firth of Forth, Souliskerry near the Orkneys, and the Skelig Islands on the Irish coast. "Upon the precipitous rocks of these islands they breed in innumerable multitudes, occupying all the ledges and summits wherever they can find sufficient space for a nest."—*Mr. Selby*. The gannets nesting on Borrera, one of the St. Kilda group, are so numerous as to give it quite the appearance of a chalk-cliff.

Materials. Principally sea-weeds, but often various kinds of rubbish found floating on the ocean.

Egg, 1. White, but it soon becomes dirty with being trodden on. "The young, when hatched, are naked, their skin smooth and bluish black, but covered in a few days with a white down, which growing rapidly soon becomes very thick, giving them in this state the appearance of large powder-puffs or balls of cotton."—*Mr. Selby*. See also Colonel Montagu's account.

SANDWICH TERN, *Sterna cantiaca*.

Situation. On the ground in the Fern and Coquet Islands, on the coast of Northumberland. "Here a station is selected apart from the other species, generally on a higher site; and the nests are so close to each other as to render it difficult to cross the ground without breaking the eggs or injuring the unfledged young."—*Mr. Selby*. The bird makes a shallow cavity among the sea campion, which abounds on these islands.

Materials. None, the eggs being laid on the bare ground.

Eggs, 3, 4. "Of a cream or wood-brown colour, blotched with dark brown and black, and with other spots of a lighter shade appearing as it were beneath the shell. The common varieties of

them are either with fewer spots and blotches upon a white ground, or of a deep oil-green, with spots of a darker shade."—*Mr. Selby.*

ROSEATE TERN, *Sterna Dougallii.*

Situation. On the ground in the Fern Islands of the coast of Northumberland, and the islands of the Firth of Clyde.

Materials. None, the bird only scraping a hole in the sand.

Eggs, 3, 4. Cream-colour or pale umber-brown, blotched with two shades of darker brown.

COMMON TERN, *Sterna Hirundo.*

Situation. On the ground in the islands of the Firth of Clyde, Solway Firth and the Western Islands.

Materials. None: it scrapes a hole in the sand above high-water mark.

Eggs, 2, 3. Various in the ground-colour, being olive-green, umber-brown, and even cream-coloured, always blotched with two shades of brown.

ARCTIC TERN, *Sterna arctica.*

Situation. On the bare ground in the Fern Islands, on the coast of Northumberland. "The colony occupies a large spot on the islet selected, and the eggs are placed so near to each other as to render it difficult to traverse the site without crushing some of them."—

Mr. Selby.

Materials. None, the bird only scraping a hole in the sand.

Eggs, 2, 3. The ground-colour olive-green, with darker blotches.

LESSER TERN, *Sterna minuta.*

Situation. On the bare ground in several distant parts of the kingdom; on the coast of Lincolnshire, especially about Skegness; on the coast of Northumberland, and on both sides of the Firth of Forth.

Materials. None, the bird merely scraping a hole in the sand.

Eggs, 2, 3. "Yellowish stone-colour, spotted with black-brown and gray, the spots thickest at the larger end: they do not vary much."—*Mr. Doubleday.*

BLACK TERN, *Sterna nigra.*

Situation. In sedgy places in the fens of Cambridgeshire, Lincolnshire, and Romney Marsh on the coast of Kent.

Materials. "About the middle of May this species prepares a nest of flags or broad grass in the most marshy places, upon a tuft just above the water."—*Col. Montagu.* Often built on the broad leaves of the water-lily, according to Temminck; and if so, it must float like the nests of the grebes.

Eggs, 4. Olive-brown, blotched with umber-brown.

BLACKHEADED GULL, *Larus ridibundus*.

Situation. In tussocks of sedge at Palisbourne in Northumberland, and in the fens of Lincolnshire.

Materials. "The gulls trample down the grass on the tops of the tussocks, and thus form a place on which they deposit their eggs, and sit isolated each on his own little island, about a foot or more above the surface of the water or swamp. Thus raised from the surface, they are seen at a considerable distance, and easily observe the approach of an enemy."—*Col. Montagu*.

Eggs, 3, 4. Pale olive-green or pale umber-brown, blotched with black-brown or dark gray.

KITTIWAKE, *Larus tridactylus*.

Situation. On sea-cliffs at Flamborough Head in Yorkshire, the Fern Islands on the coast of Northumberland, Fowls Heugh near Stonehaven, the Bass Rock and the Isle of May in the Firth of Forth, Ailsa Craig in the Firth of Clyde, and many other similar situations. At Fowls Heugh they are said to breed in vast numbers, but never in the Isle of Wight, as Mr. Yarrell supposed. "At Buraforth, a fishing station belonging to Mr. Edmonston," one of their breeding stations, "the ledges of the rocks were to a great extent whitened with their numbers, as much as they would have been by a fall of snow."—*Mr. Hewitson*.

Materials. The birds collect a little dry sea-weed and dry grass, and arrange it very carelessly on narrow ledges on the face of the cliffs.

Eggs, 2. Gray, blotched with darker gray and black-brown.

COMMON GULL, *Larus canus*.

Situation. "At St. Abb's Head, a bold and rocky headland of Berwickshire, these birds are very numerous in the breeding-season, and occupy the whole face of the cliff."—*Mr. Selby*.

Materials. "The nest is formed of sea-weed, dry grass, &c."—*Mr. Selby*.

Eggs, 2, 3. "The eggs, two and sometimes three in number, are of a pale oil-green or a yellowish white colour, blotched irregularly with blackish brown and gray."—*Mr. Selby*.

LESSER BLACKBACKED GULL, *Larus fuscus*.

Situation. On the ground or in hollows or depressions of the rocks on the coast of Northumberland and St. Kilda.

Materials. Dried grass, sometimes intermixed with sea-weed, generally comprising altogether a considerable mass.

Eggs, 3. Olive-brown or light testaceous-brown, thickly spotted and blotched with brown of two shades.

HERRING GULL, *Larus argentatus*.

Situation. On sea-cliffs and rocky islands near the coast of Wales, St. David's Headland, the Isle of Wight, St. Kilda, &c.

Materials. Dry grasses and fern (*Eupteris aquilina*).

Eggs, 3. "The fishermen told us that these gulls will lay three eggs again, if the first three are taken, and three more when the second three are taken, but no more than this, nine being the whole stock for one year."—*Rusticus*. They are olive-brown, with black-brown spots. At Freshwater these gulls "are for ever scanning the face of the cliff to catch a glimpse of an unprotected egg of the guillemot: directly a gull has found one he charges point-blank at the small end, using his beak as a lance: the huge egg, thus pierced, sticks on his beak, and he flies away as though he were carrying a great pear in front of his head: in this way he sucks out all the goodness while on the wing, and drops the shell when empty. These shells, with a great hole at one end, may often be found upon the downs above."

—*Rusticus*. "This bird is easily domesticated, and breeds in confinement."—*Zool*. 1385.

GREAT BLACKBACKED GULL, *Larus marinus*.

Situation. On the ground on the Steep Holmes and Lundy Island in the Bristol Channel, Souliskerry in the Orkneys, the Bass Island in the Firth of Forth, St. Kilda, &c.

Materials. Sea-weed and dry grass in large quantities.

Eggs, 3. Dark olive-green, blotched with black-brown.

COMMON SKUA, *Lestris catarractes*.

Situation. On the ground on wild heaths in the Shetland Islands, breeding in companies on the hills called Foula and Ronas, on the main island; and also on the small island of Unst.

Materials. Dried grass and dry ling.

Eggs, 2. Dark olive-green or olive-brown, blotched with black-brown, intermixed with a few small whitish spots.

RICHARDSON'S SKUA, *Lestris Richardsoni*.

Situation. On the ground on wild heaths, both in the Orkney and Shetland Islands, breeding in companies.

Materials. Dried grass and moss.

Eggs, 2. Dark olive-green, with irregular blotches of brown.

FULMAR PETREL, *Procellaria glacialis*.

Situation. Sea-cliffs in the St. Kilda Islands.

Materials. Generally a small quantity of thrift and dried grass.

Egg, 1. White. Sir Wm. Milner in the 'Zoologist,' Mr. Hewitson in his 'Oology,' and Mr. Macgillivray in the 'Edinburgh New Philosophical Journal,' have severally given some account of the nesting of the fulmar. I quote from Mr. Macgillivray's: — "The fulmar exists in St. Kilda in almost incredible quantities, and to the natives is by far the most important production of the island. It forms one of the principal means of support to the inhabitants, who daily risk their lives in its pursuit. The fulmar breeds on the face of the highest precipices, and only such as are furnished with small grassy shelves, every spot of which, above a few inches in extent, is occupied by one or more of its nests. The nest is formed of herbage, seldom bulky, generally a mere shallow excavation in the turf, lined with dried grass and the withered tufts of the sea-pink, in which the bird deposits a single egg, of a pure white colour when clean, which is seldom the case, and varying in size from 2 inches 7 lines to 3 inches 1 line in length, by 2 inches in breadth. On the 30th June, having partially descended a nearly perpendicular precipice 600 feet in height, the whole face of which was covered with nests of the fulmar, I enjoyed an opportunity of watching the habits of this bird, and describe from personal observation. The nests had all been robbed about a month before by the natives, who esteem the eggs of this species above all others. Many of the nests contained each a young bird a day or two old at the farthest, thickly covered with long white down. The young birds were very clamorous on being handled, and vomited a quantity of clear oil, with which I sometimes observed the parent birds feeding them by disgorging it."

MANX SHEARWATER, *Puffinus Anglorum*.

Situation. On the ground in the Orkney Islands and Scilly Islands.

Materials. A little dried fern: the bird scratches a hole between two stones or in crevices of the rocks, or makes a burrow in the sand. "The egg is frequently deposited on the fine sandy soil without any preparation, though generally there is a slight accumulation of fern-leaves and old stems. They produce but one egg, which, when laid, is of the most dazzling whiteness, and of peculiarly beautiful texture." —*Mr. Mitchell in Mr. Yarrell's 'History of British Birds.'*

Egg, 1. White, the size of a hen's egg, but equally blunt at both ends.

FORKTAILED PETREL, *Thalassidroma Leachii*.

Situation. On the ground in St. Kilda, the Orkney Islands, &c. "Not far from the top of the cliff were a colony of the forktailed petrel, breeding under the stones and rocks about a yard deep: we

were first attracted to them by a low chirping noise, which from time to time the females made while sitting on their eggs. In one hole only did we find the male and female together. The egg is considerably larger than that of the storm petrel, and resembles it in being surrounded at the larger end with a beautiful zone of red freckles. They are nearly three weeks before the storm petrel in depositing their eggs, and in the localities where we found the fork-tailed petrel there was not a single storm petrel.”—*Sir William Milner* (Zool. 2059).

Materials. None: it breeds in sandy burrows and crevices of sea-cliffs.

Egg, 1. White, with a zone of red freckles; almost equally blunt at both ends. It is not a little remarkable that Sir William Milner and Mr. Selby should differ so diametrically on the colour of this bird's egg, Mr. Selby saying it is white. Mr. Hewitson figures the eggs of both species with the zone of minute red speckles described by Sir William Milner.

STORM PETREL, *Thalassidroma pelagica*.

Situation. On the ground among stones on small islands, or rather uninhabited rocks, in the Scilly Islands and St. Kilda, in the Orkney Islands, and on the coast of Ireland. It was found by Mr. Hewitson breeding at Foula, Papa and Oxna: this excellent ornithologist says that on the 31st of May these birds had not arrived on the breeding-ground, or, to use the phrase of the fishermen, had not yet “come up from the sea.” Some eggs were deposited as late as the 30th of June. The female lays but one, which is oval and white, measuring 1 inch 1 line in length by 10 lines in breadth. During the day the old birds remain within their holes, and, when most other birds are gone to rest, issue forth in great numbers, spreading themselves far over the surface of the sea.

Materials. “The nests, though of much the same materials as the ground on which they were placed, seemed to have been made with care: they were composed of small bits of stalks of plants, and pieces of hard dry earth.”—*Mr. Hewitson* (ii. 519).

Egg, 1. White, the size of a blackbird's. See the remark on colour in the preceding species.

EDWARD NEWMAN.

Hawking at the Great Wall. — As we approach the slightly projecting angle of the coast of Pechili, where the Great Wall ends, in the waters of the Gulf of Liantung, we perceive a narrow tawny line of sand and some green clusters of dark trees, with the gable ends of joss-houses showing through the foliage, and for a back-ground a slate coloured-mountain range. The Great Wall, with its square towers and crenulated parapet, climbs the distant hills, and winds along the level plain at their bases. Landing at some rocks, we pass through a gap in the ruined pier of the Sea-Gate, mount a flight of broad granite steps, and get upon the top of the Wall. Here we see a quaint-looking watch-house, with high peaked roof and twisted gables, some important fat and lean mandarins, a few Tartar soldiers, horses and all, and a very inquisitive mass of shaven-pated, narrow-eyed, long-tailed sons of Han. The “observed of all observers,” we pass through the intensely-staring throng, and our walk upon the Great Wall of China is an accomplished fact. When we again descend to the sandy plain, we visit the temples seen nestling so prettily in the sacred groves of dark-leaved trees; and here we find ourselves among fantastic gable ends and carvings, gilded dragons, and great bells hung in old-fashioned belfries. In the courtyard of the temple of the biggest joss is an antique bronze urn, and on either side a colossal tortoise, bearing on its back an upright monolith covered with inscriptions. These old stone tortoises are possibly coeval with the Great Wall, and fashioned some 2080 years ago. The surrounding country has, for this part of China, rather a flourishing aspect, although the building within the Sea-Gate are in ruins, and the “famous myriad-mile Wall,” as the Chinese, in the pride of their hearts, love to call it, is in a very dilapidated condition, and in some parts is even banked up, and nearly covered with sand. Sheaves of newly-cut millet (the common food-plant of North China) are piled up in every field — for it is harvest time at the Great Wall; and scattered over the plain are little straggling homesteads, for the most part snugly embosomed among trees, the flat roofs of the low mud-built houses just visible here and there through the green foliage. A few Chinamen are quietly at work among the millet, and groups of donkeys are reposing in the broad shadow of the Great Wall, which is seen vanishing in the far distance. Here we halt while friend Bedwell sketches the scene, and I smoke a pipe and contemplate from behind the cloud. An old gray-bearded man silently joins us, and solemnly lights *his* pipe at the sun by means of a burning-glass, a large pebble lens without a flaw or scratch, and which he mysteriously produces from the folds of his garments. As we everywhere observe along the shores of this gulf, a belt of sandy soil fringes the sea-board, where burdock and the yellow toadflax, a small blue-flowered Iris, the wild onion, and the crane’s-bill (*Erodium maritimum*) are the only plants, and lizards and grasshoppers the only animals. In some parts the ground is swampy, and there are shallow snipe-haunted fresh-water pools. Here some teal and the garganey duck are shot by our sportsmen, as are also some curlews and some golden plovers. Two herons, the gray and the white, are common; and in this locality the godwit, the snipe and the sanderling find themselves at home. In the act of demolishing a frog the great bittern is wounded, and rather astonishes the dog “Dash,” as, with sharp open beak and bristling loose neck-feathers, he fiercely stands at bay. Overhead the wild geese and ducks are flying South in immense flocks before the cold northerly gales; the ubiquitous magpie is of course perched on the village trees, and the serious rook has work of his own among the grubs in the newly-ploughed fields; a goldencrested wren hops daintily among the low bushes; the wagtail is jerking about the dry mud-flats; the skylark, singing, is lost among the clouds; and

the quail is everywhere. Among the crowd of Chinamen at the Great Wall men are frequently seen with beautiful tame hawks on their wrists: these are goshawks (*Astur columbarius*), which they fly at quail. Falconry having come originally from the far East, the practice is doubtless more ancient than the Great Wall itself. In hawking for quail a man is required to carry a net for the captured birds, and also to beat the cover. When a quail rises the master of the hawk directs her attention to the quarry, when the goshawk darts forward and seizes the quail in her talons. The man with the net then runs up to her and takes away the quail, which is deposited with the others in his net. In this manner as many as twenty brace of quail may be taken in a day. The goshawk has a long silken cord round her neck, which is wound on a reel secured to the arm of her owner.—*Arthur Adams.*

Habits of the Dipper.—While out with a companion shooting along the river, on the 1st of October, last year, our notice was attracted by two dippers, which continually kept flying before us, every now and then settling on a stone, and jerking up their tails. The male bird would, while sitting, erect its head till its bill pointed straight upwards, and pour forth a small but pleasing song, and the female, uttering her usual note, would hop round and round her mate, every now and then flirting her tail and spreading out her wings, as if in the act of making a courtesy: the male bird while singing turned round, as if on a pivot, so as always to face his partner. After thus amusing themselves and us, they would fly further down the stream, and there recommence their pretty antics.—*John A. H. Brown; Dunipace House, Falkirk, April 2, 1861.*

Migration of Swallows.—I see (Zool. 7430) that Mr. Robson has misconstrued my note (Zool. 7315), and I must protest against such partial reference in lieu of extract, as it fails to convey one's meaning; in fact it has done just the reverse, for I am made to say that I think swallows could live through the winter, whereas I maintain that they would "perish for want of food," which would have appeared had he quoted the whole sentence. He says:—"I, however, cannot coincide with him when he says he thinks they would not suffer much, even should they spend a whole winter with us." What I stated was this:—"Swallows having been occasionally noticed by myself and others during the month of December, it might readily be imagined that in a mild winter some few at least would remain with us throughout the year, but I have already recorded my opinion that this is not the case," &c. As to my concluding remark, that I did not believe they would greatly suffer during a mild winter, having in the previous line said that they "must either wing their way to warmer climes or perish for want of food," I did not think it necessary to explain that it was from cold—not hunger—that I did not think they would greatly suffer during one of our "mild winters." That swallows would inevitably perish, were they to attempt to winter with us there can be no doubt, but that they can bear a considerable degree of cold I have had frequent proof. For instance, after a frosty night in November they reappear, apparently as healthy and lively as ever—and why? because flies are still abundant. Again, it not unfrequently happens after their arrival in April that there are frosty nights, and occasional falls of snow; but they neither remigrate nor perish—and why? because, as in November, their food is plentiful. I am therefore led to infer, "that they would not greatly suffer" (provided they could obtain the necessary food) in a mild winter, such as I have experienced here, with little or no frost or snow. One word in reference to the editorial query appended to these notes. "What impulse directs the swallow to its food, invariably guiding it in the right direction?" &c. I

shall not attempt to take a "philosophic" or comprehensive view of this impulse or law of Nature, but I would remark in passing that birds of the air, fishes of the sea, and beasts of the earth, are alike guided and directed by an instinctive and inscrutable law, implanted in them at the creation, but of which we can form no conception, it being foreign to our nature. But that it is an imperative law, and one that cannot be transgressed, and which they have no more power to disobey than they have to resist death when they have run out their allotted span of life, there can be no question; so that at a certain season—not to say moment of time—myriads of birds, myriads of fish, are simultaneously constrained to move in a certain or given direction, and that too with unerring precision; whereas man, with reason to guide him, would be at a loss to direct his course, either by land or sea, even for a few hundred miles. It may be asked, how comes it if this instinctive law be so imperative that stragglers of this migratory tribe are so frequently observed when the main body has departed? In reply to this I would state that my observations lead me to believe that none but immature or weakly birds that are compelled to do so prolong their stay, and consequently count for nothing when we take a comprehensive view of the migratory habits of the swallow.—*H. Hadfield; Ventnor, Isle of Wight, April 3, 1861.*

Occurrence of the Great Spotted Woodpecker (Picus major) in Northamptonshire.—I saw a splendid male specimen of this most beautiful and rare woodpecker the other day, in the shop of a taxidermist of this town. On inquiry I found that it had been shot a few days since, in a wood about two miles from here, by a gamekeeper. I understand that a nest of young of this bird, one of which I saw stuffed in the same shop, was taken last year not far from the same place. There may be some excuse for a gamekeeper shooting a strange bird in his preserves, but there is none for a man taking a nest of young woodpeckers, which could not be kept alive for any length of time. Every naturalist and every gentleman must regret and ought to discourage, and if possible prevent, such wanton proceedings. Two specimens, male and female, of the spotted woodpecker (*Picus minor*), have also been lately shot in the same wood.—*Henry P. Hensman, Hon. Sec. Northampton Mechanics' Institute Natural History Society; March 20, 1861.*

The Blue Rock Pigeon.—"Alceste Island"—the name of which recalls the splendours of a former Embassy to China, and many pleasant associations connected with the Narrative of Staunton and the Voyages of Captains Maxwell and Basil Hall, not forgetting Surgeon Macleod's 'Voyage of the Alceste'—is a little high island placed to the north at the extremity of the Shan-tung Promontory, the easternmost continuation of the lofty peninsula which forms the Province of Shan-tung. On the rocks above water, which form a portion of the reef which extends about a mile round the island, lie huddled together numbers of seals, which, on our approach in the boat, all tumble off into the water. The fishing cormorant (*Carbo chinensis*) evidently thinks these rocks an eligible station, and from them the captain shoots a beautiful white spoonbill with a lemon-coloured crest, as he pulls ashore in his galley. Geese, ducks and gulls are also congregated together here in goodly numbers. Indeed, besides the blue rock pigeon, which appears to have regularly taken possession of and to have colonised "Hai-leu," which is the proper Chinese name, the number and variety of the birds which make it their dwelling-place is remarkable. Swallows build in the caves, which are hollowed out in parts of the huge trachyte cliffs; here and there a giant pinnacle—a secure eyrie for the eagle and the kite. In the chasms of the steep precipices, where the sun glints on vast surfaces of shining silvery micaceous

schist, on narrow ledges of white, gleaming trachyte, and on the black, frowning, weather-stained, lichen-spotted masses which overhang the little bays, are seen blue rock pigeons (*Columba livia*) walking about, cooing, bowing to each other, and daintily preening their feathers. One is quietly perched on a slender graceful spray, which waves in the wind from one of the fissures half way down a perpendicular wall of rock of many hundred feet; others near the top seem to be paying each other polite attentions on green carpets fragrant with the scent of wild blossoming thyme. Hundreds fly out from the side of the cliff on the report of a gun, and after a short excursion return again to the security of their rocky homes. A brown owl maintains her "solitary reign" in the secret recesses; numbers of pretty hoopoes are flitting about in their peculiar jaunty manner, raising and depressing their crests and archly coquetting one with another. Large kites and two species of hawks sail, poised on outspread wings, high above the island; linnets utter their short pleasing notes as they rise in clouds; and a quail is shot in the high grass at the summit. The little bays which indent the base of the island are paved with smooth rounded pebbles of felspar and transparent quartz, and are peaceful enough to bathe in, but on the weather-side the surf thunders against the rough barnacle-clad boulders, and the war of flint and water is incessant.—*Arthur Adams.*

Occurrence of the Bustard near York.—I have this day purchased a fine specimen of the bustard, shot yesterday morning, February 22, at Rufforth, near York: it weighed 10 lbs. 12 oz.—*David Graham.* There is no ground for doubting that this was a genuine wild bird: I happened to be present when the farmer who shot it brought it into Mr. Graham's shop in his butter basket: it is going to our Museum, having been purchased by subscription and presented to the Rudston collection.—*Thomas Henry Allis.* The following, from a local paper, has been kindly communicated by the Rev. R. Bryan Cooke:—"Mr. Graham, of Market Street, who had preserved the great bustard presented to the Society, gave a short account of the bird. He stated that it was shot on the 22nd of February, at Rufforth, near York, by a man of the name of Rogers. When Mr. W. H. R. Read saw the bird he was anxious that it should be preserved and presented to the Society. This particular species of bustard was known as the *Otis tarda*, but was now extinct in this country, although half a century ago it was found upon the Wolds of Yorkshire. There were two other species already in the Museum,—namely, the little bustard (*Otis tetrax*) and Macqueen's bustard (*Otis Macqueenii*),—and, with the *Otis tarda*, the Society would possess three valuable and well-authenticated specimens of the genus *Otis*. The specimen he had just preserved was an old female bird, which, singularly enough, had about it all the markings of the male bustard, thus rendering it the more remarkable."

Occurrence of the Ringed Plover at Birmingham.—A male specimen of the ringed plover (*Charadrius hiaticula*) was shot on the 2nd of April, at Soho Pool—a pool situated within two miles of the centre of the town. As this bird was shot so far from the usual habitat of the species, and as I am not aware that it has ever occurred before in this neighbourhood I think that the fact may be worth recording.—*Henry Buckley; Church Road, Edgbaston, Birmingham.*

Common Crane (Grus cinerea) at Swatow.—Swatow, lately opened to foreign trade, is the name applied to a harbour in the north sea-corner of the province of Kwangtung, almost bordering on that of Foo-kien, and some 90 miles south of Amoy. The foreign settlement is clustered on a small island known as Double Island, at the mouth of the fine river Han, which runs up past the village of Swatow, situated on its left bank

some seven miles up, then forms into a large shallow basin, whence it strikes inland in a north-westerly direction. For years before the harbour was opened to legitimate trade it used to be one of the haunts of opium-receiving hulks and opium schooners, and in later times became the resort of coolie kidnappers and of much unlawful traffic. The surrounding country resembles in general aspect that of Amoy, and is perhaps even more destitute of verdure than our barren island, but, from its possessing such extensive sandy beaches and muddy creeks about the basin and at the river's mouth, it has been long reputed as one of the most favoured spots for waterfowl known on the Chinese coast; the spoonbill, the oystercatcher, the avocet and the phalarope have all been procured there frequently; and I was further-informed by an intelligent merchant captain that the Turkey bustard, as he termed the bird, had also been met, and was eagerly pursued for its dainty flesh. You can easily imagine how anxious I became to get possession of what I supposed was a novel species of bustard (*Eupodotis*). I sent down a Chinese birdstuffer to the spot, and wrote urgently to my friends there that they might keep a sharp look out after these birds, but all without success. Lately, however, the British Government, having opened the port under the auspices of Mr. Consul Caine, that gentleman, being a keen sportsman, as well as a lover of birds, made great exertions to procure a specimen of the so-called bustard. His endeavours have been crowned with success, and he now sends me one of the much-coveted species. But, alas! it turns out to be the crane (*Grus cinerea*), which I am informed arrives during winter in the neighbourhood of Swatow in flocks flying high and screaming. These flocks seldom frequent the sea-shore, but prefer the sandy fields planted with sweet potatoes (*Batatas edulis*), on the tubers of which they feed. They run with celerity before taking wing, and are somewhat shy of approach. Every winter season a few may be seen, but they are by no means regular in their migrations. The specimen received answers in every respect to a two-year's bird of *Grus cinerea*, and exhibits the same peculiarity of structure in the tracheal convolutions as that assigned to this species in the descriptions of authors. Bill along culmen 4 inches; along upper edge of lower mandible 4 inches. Wing 19 inches. Tarsus $9\frac{3}{10}$. Middle toe $3\frac{7}{10}$; its claw $\frac{7}{10}$. Outer toe 3; its claw $\frac{5}{10}$. Inner toe $2\frac{7}{10}$; its claw $\frac{7}{10}$. Hind toe $\frac{8}{10}$; its claw $\frac{4}{10}$. Bill flesh-brown, yellowish horn-colour for more than an inch at the tip. Inside of mouth flesh-colour. Iris pink. Legs and claws black. All those who have tasted the flesh of this bird speak very highly of its flavour. *Grus cinerea* is said to be found in India and throughout Asia generally. Schlegel notices one individual from Japan, which differed in the striking length of its beak, and to which he thereupon assigned the name of *Cinerea longirostris*. The Swatow specimen is in no way separable from the common species, and the new winter resort of this bird is therefore a fact worth imparting to naturalists. I have heard tell of a bustard found at Shanghai and Ningpo, and strongly suspect that the same may be referred to the species under consideration.—*Robert Swinhoe; British Consulate, Amoy, February 9, 1861.* [Should not Schlegel's name be *Grus longirostris*?—*E. N.*]

Storks in Zealand.—The storks arrived this morning, so we may really expect summer; for storks, unlike mortals, are never wrong in their calculations—odd birds they are. It must be a curious sight to witness one of their gatherings previous to departure at the approach of winter. A friend of mine came across an assembly of four hundred perched on the eaves of a farm-house in Zealand, and watched their proceedings. Before starting they passed in review the whole flock, and singled out and separated the aged and weakly from the rest, and then, with one accord, pounced

upon them, pecking them literally to pieces; this ceremony over, they started for Egypt. How they got their reputation for filial piety I cannot imagine. I heard a curious anecdote about them a few days since. An English manufacturer, settled somewhere in Zealand, amused himself by changing the eggs laid by a stork, who annually built her nest on his house, for those of an owl. In due course of time the eggs were hatched, and he was startled one morning by a tremendous row going on in the nest of the parent storks. The male, in a violent state of excitement, flew round and round his nest; the female chattered away, protecting her nestlings under her wings; it was quite evident that the stork was not satisfied with the produce of his helpmate; there was something *louche* about the whole affair; he would not recognise the offspring. After a violent dispute the male flew away, and shortly returned, accompanied by two other storks—birds of consequence and dignity. They sat themselves down on the roof, and listened to the *pros* and *cons* of the matter. Mrs. Stork was compelled to rise and exhibit her children. "Can they be mine?" exclaimed the stork. "Happen what may I will never recognise them." On her side Mrs. Stork protested and fluttered, and vowed it was all witchcraft—never had stork possessed so faithful a wife before. Alas! how seldom the gentle sex meets with justice in this world, when judged by man, or, in this case, stork kind. The judges looked wondrous wise, consulted, and then of a sudden, without pronouncing sentence, regardless of her shrieks for mercy, fell on the injured Mrs. Stork, and pecked her to death with their long sharp beaks. As for the young owls, they would not defile their bills by touching them; so they kicked them out of the nest, and they were killed in the tumble. The father stork, broken-hearted, quitted his abode, and never again returned to his former building-place. Six years have elapsed, and the nest still remains empty; so stated my informant.—*Marryat's 'Residence in Jutland.'*

The Black Surf Duck.—On the Shan-tung side of the Gulf of Pe-Chili is a remarkable promontory with a flat sandy neck and a saddle-head of granite. This from a distance looks like an island, but on a nearer acquaintance its true nature is obvious. The surf duck and Saddle Point go together in my mind and refuse to be separated, so you cannot have one without the other. A gale of wind had swept over the gulf the day previously, so the water is now unsettled and turbid, a dull haze formed of fine sand fills the air, and a "mirage" causes everything at a distance to assume a distorted, unreal appearance. As you land you encounter at first nothing but glare and sand: along the margin of the shallow bay and in the sea-weedy pools left by the receding tide are countless myriads of ladybirds drowned, like Pharaoh's host, in the waters of the sea; they have been blown from the opposite coast, and are now driven up by the waves in ridges miles long and in red heaps among the hollows and corners of the outcropping granite rocks. Here and there we come across a magnificent swimming crab (*Neptunus gladiator*, De Haan); but these "waifs and strays" are just as eagerly sought after by lean, hungry cormorants and loud-screaming gulls as by inquisitive peripatetic naturalists, so the latter "*animal implume bipes*" only comes in for a scattered mass of fragments too hard and spiky even for the maw of a cormorant or a gull. Some specimens of a pretty Polybius, in a perfect state, fall however to his share. As we descend the brown and barren stone-strewn hill towards a little Sahara of sand a hare limps away before us, and the hot bare rocks are enlivened by the coquettish movements of the pretty hoopoe, but beyond these and grasshoppers there are no signs of life. We pass through a small, close, unsavoury village, and arrive at a vast level sandy plain, quite hard and dry in some parts, but showing

generally the characters of a salt-water swamp, with glistening white patches of incrusting salt, shallow lagoons and tawny spaces, where the curlews stalk about like so many diminutive ostriches, and where, by mutual agreement, avocets, sandpipers and godwits assemble for a diligent search after palatable worms. Across this weary waste mules and donkeys wend their way in single file along the narrow paths, and here and there a dark blue dot points out some patient Chinaman digging land-crabs for his supper. As we are going off to the ship the poor fishermen, in great dog-skin boots, come in through the surf, in rude log-built catamarans: weary and dripping, they fling down on the sand great heaps of turbot and plaice, soles and skate; they also fling down dead surf ducks (*Oidemia nigra*) in astonishing numbers, which they say were drowned in the gale and got foul of their nets. These ducks are not uncommon all along the Shan-tung coast: they are ungainly surf-loving birds, seeking safety from the sportsman chiefly in diving, and are very difficult to hit; on the flash of the gun they dive under the water, hardly ever waiting for the report: they fly in a straight line just above the surface, in a heavy and awkward manner. As articles of food they are abominable, their flesh being hard, dark, dry and fishy. — *Arthur Adams.*

Rambles in search of Skulls. By ARTHUR ADAMS, Esq., F.L.S., &c.

THE remark of the "needy knifegrinder" to the compassionate gentleman who inquired into his history, "Story! God bless you, I have none to tell," will equally apply to me. And yet, as I meditate over a quiet pipe in my floating sanctum, each bone and skull that hangs around me recalls certain little incidents which I am unwilling to keep entirely to myself. That little cramped foot reminds me of the bombardment of Canton, and was taken from an unfortunate woman who was killed by one of our shells. That baby-skeleton points to the prevalence of infanticide in China, for its owner was drowned in the Pearl River by its unnatural parent. That mummified foetal deer brings before my mind's eye the shaven-pated doctors of Japan, who find in such as that a valuable remedy.

I confess to a weakness for skulls: from the simple cartilaginous rudiment of the cuttle-fish to the ample dome where intellect once sat supreme, all skulls have great attractions in my eyes. When, therefore, I "pitch my foot" against a skull, like Hamlet, Prince of Denmark, I take it up and regard it with speculative interest. I touch lightly, however, on the bleached human skulls I obtained by the banks of the Pearl River; suffice it to say that several, in beautiful preservation, adorn my collection. In one I discovered in a "chatty" on the green summit of Tiger Island a snake had formed her nest; and another in my possession was the plaything of little Chinese children, who were rolling it about on the ground.

For many skulls I am indebted to the prowess of our sportsmen. My seals are from Todomosiri, my great eagle is from Manchuria, my Moschus crania are from the Korea, and my albatross and giant petrel from the broad bosom of the Atlantic. Others are of my own procuring; thus my turtles and my pigmy deer are from Sunda Strait, my scaly anteater is from Whampoa, my Babirusa's skull is a present, and a few are purchases from Canton old curiosity-shops. My largest skull once belonged to an antlered monarch of Manchuria; and this is the story of its acquisition:—A party leap on shore at Sio-wu-hu Bay, and, like young horses just let loose, disperse themselves, in various directions, for a glorious run. Some scour the plain, rejoicing in their liberty, and gather great bunches of roses and peonies; some wander thoughtfully along the strand, thinking possibly of home and Polly; one, gun in hand, dives among the oak-woods, intent on game; and one, sweeping-net aloft, wades gleefully among the flowers. But now the sun declines, and all must go on board. A form approaches from across the plain, like amorous Falstaff at Herne's old oak; huge antlers branching out above his head; a vasculum, cram-full of plants, athwart his back; and in each hand, blushing floral trophies: it is Wilford of the "seven-league boots," who has found the cervine relic in the woods.

And now, to change the scene, I saunter along a winding path, narrow and irregular, by the side of a rocky gully in Tsu-Sima. The gurgling water rolls clear and sparkling over its stony bed, except where a big boulder checks its gentle course, when a deep pool is formed, where little trout-like fish calmly disport themselves. The sides of the ravine, clothed with leafy beauty, rise up around; and trees of great variety, waving their green heads in the soft sea-breeze, are springing from every rift in the slate-stone rocks. Onward I stroll, now taking a snail from the bushes, and anon making prisoner of a longicorn, till I emerge, from under the wild mulberry trees, upon an upland slope, green and pleasant to the eye, and bordered with dark woods and yellow raspberry-bushes. What is that white gleaming object in the grass? A cranium of some unknown deer of Japan? Nay, smile not, gentle reader; 'tis a horse's skull!

I am now in Alga Bay, a deep inlet ending in a river, with wild, uncultivated, rocky sides, covered with wood from the water's edge. I work my way from near the entrance to where a party is hauling the seine on the right bank, wading through long rank grass, sweeping for insects among the flowers, and beating the young oaks; all the while stumbling over mouldering trunks of trees, and loose,

old, moss-grown stones ; out by the clear sunshine, and the sandy shore with its heaps of drift-wood ; picking up Harpali, under great chips of trees felled long ago by hunters ; detecting *Cecina manchurica*, a new form of mollusk, under damp logs near the sea. Half maddened by mosquitoes in the cool shade of crowded trees ; half blinded by a gauze veil which I ship in despair, I can yet see a strange insect in the air, flying like a longicorn. At risk of broken shins I give chase and capture it, and find it a Myrmeleon-like Neuropteran, with curious cup-shaped knobs at the end of long antennæ ; I pass among the prostrate branches of a huge linden tree, lately felled by fishermen and still laden with blossoms, from which bees are busy extracting nectar ; I come across bushes crowded with *Canthari* of a pale red colour, with green head and thorax ; I hear an ominous rustle of dead leaves on the dry elevated ground, and see the slow, fat, undulating form of a great-headed adder, angrily making his way from the invader of his solitude ; and now I suddenly encounter a stone arch of uneven granite, rude, natural and Cyclopean, overgrown with weeds, spotted with lichens, and half-concealed by a rank undergrowth, yet a veritable arch of rugged stone ; and I think of those mystic Stonehenges and primæval altars, built by white-robed, bearded Druids, on plains and in sacred groves, full of mistletoe-covered oaks, for purposes of mystic and most probably unholy worship. Under my rude arch I creep with a childish kind of pleasure, although to have gone round would have been far easier. The strong lines of a spider's web, of unusual size, with a fat bloated occupant in the centre, opposes my progress, but only for a moment ; Arachne's web is rent, and the "long-legged spinner" placed in durance vile. At length, fatigued with my exertions, I repose on a log near the shore, and observe, not very far off, a something in the drift, which turns out to be an imperfect skull of *Steno*, a genus of true dolphins.

To the north of Cape Notoro, in Amiva Bay, Saghaleen, is a rocky and a lonely spot. It is a long, low point, projecting into the beautiful wide bay, composed of great rounded rocks and drifted shingle. Here, sheltered by the granite boulders, and concealed by coarse grass and reeds, come the old and the sick of the seal tribe, which inhabit these waters, to seek refuge from their fellows, and in peace to breathe their last. The impress of their huge bodies may be traced on the dead, soiled, flattened herbage. From the quantity of bones strewn about the place I think this must be the chief cemetery of the seals. It is, I have said, a wild and lonely spot. The only

sounds that disturb the silence are the harsh notes of wild swans passing high overhead, and the frightened caw of a rook soaring, dodging, and trying in vain to evade the pursuit of a determined hawk. The solitary wildness of the seals' graveyard is hardly relieved by the sudden appearance of three Ainos, aborigines of Saghaleen, who have come over the neighbouring cliffs to gaze upon the brown-haired strangers. These stand, motionless and silent, watching our every movement with a fixed and wondering stare. Long white spinous processes of the dorsal vertebræ of a whale stick up above the grass, looking like tombstones of departed Phocæ. Here I discover a rare prize, in the skull of *Lobicephalus*, a large fierce seal, with a vertical bony crest extending from the frontal bone to the occiput. An imperfect skull of the Halicore, or dugong, is another grand addition; and I obtain, besides, the crania—both, alas! much injured—of two species of *Delphinus*.

We are now in St. Vladimir Bay, a wide and deep bay on the Manchurian coast, a little north of Alga. Sea-cliffs bound the long curved outline of the bay, their summits green with oaks. Below them the ground is level, and a belt of verdure extends from the cliffs to the water's edge. The undergrowth is dark and humid, and the number of fallen trees, in various states of decay, promise well for snails and slugs and fungus-loving beetles; *Boleti* stud their rotting boles, and in these *Mycetophagi* reward our diligent research. Shade of *Fabricius*! what swarms of insect life! The ants alone are worthy the pen of *Nylander*; and as for the spiders, the erudition of *Walkenæer* and the industry of *Blackwall* would be needful to pourtray their varied forms, and illustrate their wondrous instincts. I penetrate a thicket, and bushes laden with bunches of currants grow all around. Feeding on these with the greedy voracity of a schoolboy, my attention is diverted to a split bamboo, with the valve of a *Pecten* stuck in the fissure. A nearer scrutiny assures me this means *water*; and lo! a clear pool lies hid among the herbage. Some wandering Tartar has been here, and, having slaked his thirst, has in gratitude placed this useful beacon. But what is that suspended from a bough which overhangs the beach? It is a skull, and the skull of a bear, for the lower jaw and other bones of the defunct Bruin are lying on the shingle beneath; and there hangs his cranium, like as the sour grapes above the desiring fox. Sailors must obtain the skull, for I cannot. Now, as good luck would have it, the sailors wanted water, and close at hand a tiny spring distilled a slender trickling rivulet from the cliff, and filled an excavation in the shingle. By enlarging

this you get a goodly cistern, and, by means of a hose and Earl's engine, the cold clear water is speedily transferred into a canvass tank in a pinnace. Accordingly in due time come the sailors, and very shortly after their arrival the cranium of the bear is mine.

ARTHUR ADAMS.

Shanghai, January 29, 1861.

Nesting of the Crisped Pelican in Western Greece.—Time was, and not so long ago, when *Pelecanus crispus* lived in hundreds all the year round, from the rocky promontory of Kourtzolari, hard by the mouth of the Acheloius, on the western extremity of the lagoon, to the islands of Ætolico, up its northern arms, and, on the east, to the great mud-flats which mark the limits of the present delta of the Phidaris. Now-a-days a solitary individual may be seen fishing here and there throughout the lagoon, but the small remnant of this once mighty host have made their last stand upon the islands which divide the Gulf of Procopanisto from the Gulf of Ætolico. Here, towards the end of February last, the community of pelicans constructed a group of seven nests, — a sad falling off from the year 1858, when thirty-five nests, the remains of which had not then disappeared, were grouped in contiguous proximity upon a neighbouring islet. It needs not the nose of a pointer to discover the locality, even if the large white birds themselves were not a sufficient guide. As we approached the spot in a boat the pelicans left their nests, and, taking to the water, sailed away like a fleet of stately ships, leaving their newly-built establishment in possession of the invader. The boat grounded in two or three feet of mud, and when the party had floundered through this the seven nests were discovered to be empty. A fisherman had plundered them that morning, taking from each nest one egg, all of which we of course recovered. The nests were constructed in a great measure of the old reed palings used by the natives for enclosing the fish, though with these were mixed such pieces of the vegetation of the islet as were suitable for the purpose. The seven nests were contiguous, and disposed in the shape of an irregular cross, the navel of the cross, which was the tallest nest, being about thirty inches high, the two next in line on each side being about two feet high, the two nests forming each arm of the cross a few inches lower, and the two extremes at either end being about fourteen inches from the ground. These latter, it is presumed, were intended for the junior partners of the firm, in the same way that the great bear of nursery tales has a big seat, his wife a middling seat, and the little bear a small seat. The eggs are chalky, like those of the *Pelecanidæ* generally, very rough in texture, and some of them much streaked with blood.—*W. H. Simpson, in 'Ibis,'* ii. 395.

Lizard with Bifid Tail.—I happened a short time since to meet with an interesting specimen of the common lizard bearing a bifurcate tail. I am not aware that such is a usual termination of the caudate appendage in this class of animals, and it may be worth recording. This specimen was captured when basking on a warm bank, and

it is a male. The colour is a rusty brown, faintly barred and streaked. I conclude from this and from the size and length of the tail that it must be of very mature growth. Whether the condition of the tail results from injury or whether it is congenital may be a fair question; I should rather opine the latter, as there seems no reason to think a member would be reproduced in a duplicate form, at least such an excess of reproductive energy must be very uncommon.—*J. Hawkes; Kent County Ophthalmic Hospital, Maidstone, March 23, 1861.*

Notes on the Natterjack.—When visiting the other day Mr. Thomas Brightwen the conversation happened to turn upon our natural curiosities, and he wished me to write to you about one of them, the natterjack as we call them (*Bufo calamita*). We have them in immense numbers here, and they have several names, “running jacks,” “running toads,” while the common toad is distinguished as the “hopping toad.” When repairing a floor in my dining room some years ago we took half a bushel of natterjacks out. In the parts of Norfolk where they are not to be found they are the “magic toad,” employed to cure rheumatism, &c. I know a man who caught a “running toad,” shut it up in a small tin box, and wore it next his heart, the supposition being that as the toad dried up the rheumatism would leave. The backbone of a “running toad,” is supposed to swim against the stream, and if reduced to powder and given to a horse as snuff the horse will follow you anywhere—a new way this of “Rarey-ing” a horse. These notions only prevail where they cannot easily be put to the test of a trial. There is no good account of these animals; I have read Bell’s ‘British Reptiles,’ the translation of Cuvier, &c., but none give an account from personal observation. The habits of the natterjack are very different to those of the common toad. They, like hares, make little forms in my onion beds, and like those animals change them according to the direction of the wind, or rather, I suspect, according to the dryness of the wind, as in very dry weather they bury themselves up or get under flagstones, &c. They seem to suffer from dry even more than the common toad; their croak too is different, and they appear later in the spring. May I commend them to your notice? I shall be most happy at any time when you may visit Mr. T. Brightwen to show you some or to send some to you. I have sent some through friends to Professor Bell and to the Zoological Gardens.—*Edward Gillett; Vicarage, Runham, Stokesby, Norwich.—Communicated by P. H. Gosse, Esq.*

Toads and Lichens.—After much scrambling and unwonted exertion, I find myself on the top of the hill, among a heap of Old-World stones. It is just after a heavy rain, and the rocks are still wet and dripping. I see nothing but a number of gorgeous toads in a bright livery of black and scarlet, and lichens enough to satisfy the desires of the Rev. C. Berkeley himself. The rocks at these elevated situations are larger and more visible than those below, which, moreover, are often concealed by Eleagnus bushes, besides Smilax vines and other creepers. The ancient weather-stained masses are often heaped up in the strangest confusion, and possess a positive though borrowed beauty from the Lepralias and other lichens with which they are encrusted. They are usually of a frosty white, pale green or rusty brown, but sometimes you observe a bright orange patch. Among these lichen-covered fragments of primeval granite I find the harlequin toads; and as the rain has brought out the worms and other dainties on which they feed, they are hopping lazily about in all directions. I know not if this very peculiar toad has been described, but I have preserved some specimens in spirit for Dr. Gray. The orange, however, has turned dull

yellow from the action of the alcohol.—*Arthur Adams*; *Tcho-lien-hae, Chusan Harbour, Korea.*

A Remarkable Shark.—On the 20th of November, 1859, we touch at the Oki Islands in the Sea of Japan, and I land with the captain at the village of Nisi-Bama. The valleys between the steep wooded hills are very curiously cultivated in terraces, causing them to resemble so many verdant amphitheatres. We pass through a wicket, ascend a steep path through a grove of fine trees, and find it leads to the trunk of a gigantic bastard banyan or *Ficus nitida*, evidently a sacred tree, for the base is covered with paper effigies and other votive offerings, and a little gaudy joss is discovered squatting in a niche. On regaining the village we find the people very civil, though rather in awe of the foreigners, possibly the first of our race they had ever seen. Their houses are neatly built with tiled roofs, and comfortable sheds for horses, cows and pigs. Dried squids abound, and from the projecting rafters of some gable ends I observe sundry grotesque-looking dried sharks' heads, evidently the trophies of adventurous fishermen. Entering an abode so decorated I encounter an aged crone pounding the daily rice, who was inclined to be in a rage, but with much art and "*suaviter in modo*" I effect the purchase of the architectural ornament for the small sum of one itzebu. This squaline caput is sufficiently bizarre to merit observation. It has been inspected by many a seafaring man, from an Admiral to a powder-monkey, and its physiognomy, though sufficiently striking, is unknown even to a class usually well acquainted with the tribe in question. The head is narrow and somewhat compressed, and covered with a smooth black skin. The snout is long, triangular and pointed, not depressed, and projects considerably over the mouth, which is open, with a wide gape, and the gums are exposed and painted red. The eye is large and round, and unprovided with a nictitating membrane or eyelid. The nostrils are oblique, ear-like openings placed at the lower part of the muzzle, midway between its tip and the eye. The teeth are arranged in three series, the outer row erect, the middle semi-erect, and the inner decumbent. They are similar in each jaw, and are long-pointed curved cusps, with their lateral edges sharp and simple.—*Arthur Adams.*

Snake-like Fishes.—Any particulars concerning ophiod fish, in which, Mr. Editor, "your spirit doth take delight," will I am sure be welcome to the pages of the 'Zoologist;' and have I not a right to speak about snake fishes? did I not capture in the middle of the South Atlantic a fish, which, if it had measured fourteen feet instead of fourteen inches, would have created far more astonishment than the *Regalecus Jonesii, Newman?* My fish (*Nemichthys scolopacea, Richardson*), taken in the towing net, and even now without a place in the ichthyological system, much more resembles a sea-serpent than, Mr. Editor, does yours. It is scaleless, and has sharp-pointed teeth inclined backwards like those of a serpent; the body is ophiod and spotted on the sides; the eye is large and conspicuous; the jaws are very long; the gape is wide, and the back is furnished with a series of rays which extend crest-like from the nape to the end of the tail, which has no caudal fin. You will see a figure of it from my drawing in the 'Zoology of the Voyage of the Samarang.' Who shall say it is not the fry of a very formidable spar-snapping sea monster? But the object of my present communication is to show that Swainson is in error when he says of the ribbon fishes, "These meteoric fishes appear to live in the greatest depths," &c. My experience to the contrary is founded on the silvery hair-tail (*Trichiurus lepturus, Linn.*), one of the largest

of the flattened small-scaled fishes. At Staunton Island, Shan-tung, we obtained large numbers averaging five feet in length, including the slender caudal filament. It is common along many other parts of the coast of northern China, and in the Korea it is salted and dried, and forms an important item in the diet of these people. It is most delicate eating, and cut in lengths and fried it forms a very pretty dish. The bones are so few and easy to separate that even a hungry man may partake of it without fear of being choked. Everywhere it is taken at a considerable distance from the land, and at the surface. Off the Regent's Sword, or Lian-tie-Shan Promontory, great numbers of strange-looking craft in the form of rude rafts put boldly out to sea, long black nets coiled up snugly in the middle, four men working at huge skulls and the others smoking and chatting. The net is paid out in a circle, and when the end is come to, the net is turned back and hauled in, securing frequently large numbers of the silvery hair-tail. Many hundreds of these rafts surrounded the ship as she sailed through them in the glow of a glorious sunset.—*Arthur Adams.*

Musical Fishes.—"Mute as a fish" is certainly very expressive, and moreover is generally true, though I have heard toad-fish grunt pretty loudly when taken out of the water. A "fish up a tree" seems an almost impossible thing, but have we not the climbing perch of India? A "fish out of water" appears strange and unnatural, but species of *Periophthalmus* are seen hopping about the mud-banks of Chinese rivers like any frogs. With fishes that fly or suspend themselves in the air we are familiar. That certain fishes are enabled, by means unknown at present, to produce sounds under water is no less certain, and is a fact well known to seafaring men. Captain Ward tells me that the "drum" is familiar to the inhabitants of Charlestown in South Carolina. When he was lying off that place in the "Thunder" mysterious sounds were heard from time to time in the bottom of the ship, which were generally ascribed to insects in the spirit room. One day, however, some ladies visited the ship, and on hearing the peculiar vibrating noise exclaimed, "Ah there is the drum-fish." They described it as of large size, and declared that the roe was considered a great delicacy. In October, 1857, the "Actæon" was lying off Macao, near the entrance to the Canton or Pearl River, and every evening the drum-fish used to assemble around the vessel and continue their musical humming till about midnight. My messmate in the next cabin would call out "There go the drum-fish," and we would sometimes lie awake for an hour or so listening to the sounds. As we were only separated from the fish by the thickness of the ship's side their continuous drumming was very audible. Sometimes they appeared to be "skylarking" or darting at the copper, as if feeding on the barnacles, and at other times we used to fancy they were rubbing their scaly sides against the vessel.—*Id. ; Shanghai, December 8, 1860.*

Occurrence of Amathina tricarinata in Saghaleen.—The occurrence of rare birds and peculiar beetles is often recorded in the 'Zoologist,' almost to the entire exclusion of Crustacea and Mollusca. I have on several occasions endeavoured to supply this hiatus by a few brief notices of the finding of crabs and shells, frequently showing the extreme geographical range of particular species. I believe this will be found the extreme northern range of *Amathina tricarinata* of Chemnitz,—a shell so well marked as to render tracing its distribution in space very desirable. The southern extremity of the island of Saghaleen (I spell it as it is pronounced by the Ainos) is named Cape Notoro,—a long, rather low promontory with a cliff-like head and a reef

of straggling rocks, which extend off it at some distance. Between the reef and the rocky cape there is a level stony flat, which is nearly dry at low water. The tide is out, so, armed with my walking-stick, I pass along the exposed level rocks round the very end of the Cape, and a wild scene it assuredly is. As the tide comes in, the roaring of the surge, as the breakers from the reef come rolling in, is extremely solemn. The feeling of loneliness is so complete as almost to make the flesh creep as you pass one corner after another, and find dark caves in the rocks where Bruin may be lying *perdu*. Far out upon a sandy spit the black-tailed gulls (*Larus melanurus*, Temm.) are assembled, and along the rocky level the rooks are busy feeding on the rotting *Cryptochitons*, which the surf has thrown up dead upon the strand. The white bones of a whale, half-buried in the sand, show where some leviathan has been wrecked in trying to double the Cape. On the opposite side I find a sandy bay, with great heaps of *Zostera*, *Fucus*, *Laminaria*, and other sea-weed, thrown up recently upon the beach. Here I find *Amathina tricarinata*, and among the weed and along the high-water line, where fragile things are often deposited by the ebb tide, I gather a good store of *Velutinidæ*, pink, calcareous, black, membranaceous, brown or covered with a velvety epidermis.—*Arthur Adams*.

Squid-fishing in Japan.—On the 19th of November, 1859, we arrive late in the evening off Nisi-Bama, in the Oki Islands,—a very charming little group not far from the shores of Nippon. As we near the anchorage the lights on the water are so numerous and brilliant, and all moving about in such an exceedingly *ignis fatuus* kind of a manner that a boat is sent away with the interpreter to ascertain the cause of such an unusual spectacle. On his return “Oudah” reports that the maritime “will-o’-the-wisps” belong to fishing-boats, hundreds of which, he says, are out looking for “Ika-Surame,” which phrase, after much circumlocution and many elaborate explanations, turns out at length to mean simply “Squids.” The lights are produced by kindling birch-bark in small kinds of gratings with long wooden handles, machines known among seafaring men by the name of “devils.” The flame of the fires is very clear and vivid, and the “devils” being held over the sides of the boats attract the squids. These latter, I find, are a species of *Ommastrephes*, a sort of sea-cuttle, which is nocturnal in its habits, and which swims very rapidly near the surface in immense shoals. The squids are taken by what is known among fishermen as “jigging.” The “jig” is made of iron, and consists of a long shank surmounted by a circlet of small recurved hooks. These cuttles are favourite articles of diet both with the Japanese and Chinese, and are very carefully dried for the market and sold in vast quantities. They are also extensively used as bait in fishing for bonito and other large *Scomberidæ*, which abound along the coasts; the squid is strung through its entire length, the club of one of the long tentacular arms artfully covering and concealing the hook. Near Hakodadi there is a small fishing village exclusively devoted to the capture and curing of these nutritious *Cephalopods*. Many hundreds of thousands may here be daily seen drying in the open air, all very nicely cleaned, each kept flat by means of little bamboo stretchers, and suspended in regular rows on lines which are raised on poles about six feet from the ground. The open spaces are filled with these squid-laden lines, and before all the houses in the village squids everywhere form a novel kind of screen. The Japanese name of the place is “Shai-Sawabi,” but by us it was always called “Squid Village.”—*Id.*

Notes on a Trip to Loch Rannoch. By EDWIN BIRCHALL, Esq.

A LEISURE week, during the past summer enabled me to gratify a long-cherished wish to visit this celebrated entomological locality. Entering Scotland by the estuary of the Clyde, the mountains of Argyleshire and the rugged hills of Arran close in upon the river and give to its reaches the aspect of lakes, but as the stream continues its course towards Glasgow the great river gradually assumes a ditch-like aspect, running between low marshy banks, the deep-water channel being indicated by small stone erections, each surmounted by a pole crowned with an empty whiskey barrel,—rather an original emblem of Scotch taste and nationality.

A pleasant day was spent with my friend Thomas Chapman, at his county residence on the shore of Loch Long, and a stroll up the hill behind the house, among many other insects, produced *Scopula alpinalis*, *S. decrepitalis*, *Coremia munitaria*, and *Larentia flavicinctaria*, none of which I had before seen alive. Next morning I was *en route* for Rannoch; rail to Dunkeld, thence coast to Pitlochrie, rapidly took us within thirty miles of our destination; but from this point visitors must make their way as well as they can. Our old friend Foxcroft used here to put his traps into a barrow, and with sturdy independence wheel it before him into Rannoch, often doubtless on the way deserting the shafts to make a dash at a passing "Glory," or pin a sleeping *Nubeculosa* on the stem of a rugged birch; and I may here mention that he seems to have been universally known and much respected at Rannoch, and apparently very sincere was the regret expressed at the news of his death.

The road runs for several miles through ancient birch-woods, then along the banks of Loch Tummel, and skirting the base of the mighty Schehallion commands glorious views of mountain and lake. Independently of its majestic aspect, Schehallion possesses interest of a varied nature; it is said to have afforded shelter to Bruce after the battle of Montrose; on its side the truth of the theory of gravitation was practically demonstrated, and the planet was weighed in the philosopher's scales; and, lastly, it is the locality for that rarest of British *Noctuæ Pachnobia alpina*.

Loch Rannoch is about ten miles in length, and, except a narrow belt of cultivated ground bordering the lake, is buried in woods, morasses and mountains—a very Paradise for the naturalist, no matter what his peculiar bent may be. There is a good inn at Kinloch-

Rannoch, at the foot of the lake, and a small but tolerably comfortable one in the village of Ignalin, at the head.

Grouse, both black and red, were very abundant on the hills, and once a noble capercally was observed sunning himself on a fallen tree, and looking very like a turkey. Gamekeepers were reported to be both numerous and obstructive, but we saw none of them, and roamed over moor and mountain without hindrance or annoyance of any kind.

The nests of *Formica rufa* which abound throughout the district, many of them three feet high and eight or ten in circumference, were a source of great interest, not only as wonderful monuments of patient labour, but as containing that singular and local insect *Tinea ochraceella*. I am sorry to say we overthrew many nests, and entailed sad trouble on the industrious owners, before we hit upon the right method of capturing the moth, which, for the use of future visitors and for the protection of the unfortunate ants, I beg to say is to search the stems of grass around the nests late at night with a lantern, or early in the morning before the sun is hot, when the insect may be taken in the greatest profusion, whilst during the day a whole nest may be rooted up and only a solitary specimen disturbed from its recesses. A large Coleopterous larva was abundant in the ants' nests, probably *Cetonia ænea*; this beetle came freely to the sugared trees during the day. Although the end of July snow lay in large patches on most of the hills; a mass to which one of our party ascended was apparently several acres in extent, and upwards of six feet in depth, and it seemed probable could bid defiance to what remained of the inclement summer of 1860. What is left of the Black Forest is principally composed of pine trees, some of these veritable giants; the younger plantations are mostly birch and oak; fern and heath are everywhere.

The following list includes our principal captures during the five days of our stay at Rannoch.

Erebia Blandina. Abundant on the heaths.

Chortobius Davus. Abundant on the heaths.

Endromis versicolor. Larvæ on alder.

Ceropacha flavicornis. Larvæ on birch.

Xylophasia polyodon. Black variety not infrequent at sugar.

Noctua xanthographa. Several specimens closely approaching *N. sobrina* in appearance.

N. festiva and *N. conflua*. Extremely abundant at sugar. The series obtained does not favour the idea of *N. conflua* being a distinct species.

Hadena adusta. Abundant at sugar.

H. contigna. Abundant at sugar.

Aplecta nebulosa. Scarce at sugar.

A. tinctoria. In swarms at sugar.

A. occulta. Came freely; all the black variety. *A. tinctoria* sips the sugar with its wings quivering like *Thyatira Batis*, and drops the moment the light approaches. *A. occulta* sits as if glued to the tree, with wings flat almost as those of *Triphæna pronuba*. Neither species will remain quiet when boxed; they must be killed as taken to secure fine specimens.

Leucania impura, *Agrotis porphyrea*.

Psodos trepidaria. Abundant on the summit of Craig Cross, but time did not allow us to make the ascent.

Scodiona Belgiaria.

Larentia cæsiaria. In thousands.

L. flavicinctaria. Not uncommon. Sitting on rocks.

L. didymata.

Dasydia obfuscata. On rocks at considerable elevations, but both scarce and wild.

Geometra papilionaria. At light.

Fidonia quinquaria. Abundant among brake fern, but local.

Coremia munitaria. In every water-course.

Acidalia fumata. Disturbed from among heath. Common.

Emmelesia ericetaria. In profusion on the hills.

E. blandiaria.

Ellopiæ fasciaria. Beaten from pines.

Scopula alpinalis. Abundant.

Crambus pinetellus, *C. margaritellus*, *Penthina prælongana*, *P. ochromelana*, *Tinea ochraceella*, *Depressaria ciniflonella*, *Cetonia ænea*.

Trichius fasciatus. On flowers of Orchis.

Pissodes pini, *Rhagium indigator*, *Serica brunnea*.

I was much struck with the great variation from ordinary southern forms of many of the Rannoch Lepidoptera, and take the present opportunity of urging closer attention to the influence of locality, food, &c., on specific distinctions, believing that much of the causes and limits of this variability may be learned by careful observation.

Mr. Darwin's theory seems to have few friends among entomologists, and perhaps his happiest illustrations are not from our branch of Science; but how few of us have really studied the question, and can say what Entomology does teach on the subject of specific variation!

Why should the colours of Lepidoptera be usually darker in Scotland and Ireland than in England? Why should *Aplecta occulta* be

black at Rannoch (its head quarters), and in Yorkshire and Lancashire so light as scarcely to be distinguished by a tyro from *Aplecta nebulosa*, a southern insect which scarcely reaches Scotland? Have not all species a tendency to lose their distinguishing marks and approach allied forms at their outer limits of distribution? How is the gradual disappearance of the white spot on the wings of *Lycæna Artaxerxes* as we go South to be explained? Would the eggs of *L. Artaxerxes* or of a Rannoch *A. occulta* if fed up on English plants produce the English or the Scotch form of the insect?

But such questions are endless; a more extended knowledge of the range of our native species, and especially of their continental forms, would, I am persuaded, be of infinite service to us, even though it led us to doubt whether the term "species" is anything more than a "Geographical expression;" at present it seems to me that those whose knowledge is most exclusively confined to British insects are the most hasty and dogmatic in their opinions on species. It is much to be regretted that even the stupendous collections of the present generation are in most cases of but little use for the solution of such questions. "Whole rows" may be seen arranged on no other plan than to put the smallest specimens at the top, British and foreign, North and South inextricably mixed, so that the row be only made up; and he would be a bold man who spoke positively of the origin of any insect not captured by his own hand.

But I have wandered far from Loch Rannoch, and I fear my readers are disgusted at finding so promising a title has only led them into the undrained bog of the species question, so I will conclude by advising all who can to pay Rannoch a visit, assuring them they will never regret a few days spent in those ancient woods and by that bright lake if they can contrive to exist on mountain mutton, trout, oat-cake and whiskey, and do not mind their own being the only pair of trousers within a dozen miles.

EDWIN BIRCHALL.

Birkenhead, February 10, 1860.

Translated Life-Histories of Sawflies, from the Dutch of M. Snellen Van Vollenhoven. By JOHN W. MAY, Esq.

THE following descriptions are translated from the Dutch of M. S. C. Snellen Van Vollenhoven, President of the Netherland Entomological Society, and are the first of a series of descriptions of indigenous Tenthredinous insects, in course of publication in the 'Trans-

actions' of that Society, which I hope to be able to lay before British entomologists in the pages of the 'Zoologist.' The descriptions in the original are accompanied by coloured plates of the different states of the insects. These could not be published in the 'Zoologist,' but I have retained the references to the figures in the text, and shall be happy to furnish copies of the different parts of the Netherland Entomological Society's 'Transactions,' containing the plates in question, to any one who may wish to have them. Each part will contain two or more plates, and the cost of each part will vary from 2s. 4d. to 3s. 8d., as I am at present informed; at any rate I shall be happy to let any entomologist have the plates at the price I may have to pay for them.

JOHN W. MAY.

19, Clifton Road East,
St. John's Wood.

ABIA (CIMBEX) ÆNEA, *Klug.*

Imago: *Linn. Syst.* ii. 922, *Tenthredo nitens?* *Hartig, Blatt. und Holzwespen*, No. 7, p. 73. *Lepelletier, Mon. Tenthr.* No. 100, p. 37. *Klug, Blattwespen*, p. 91. *Leach. Zool. Misc.* No. 1, *Abia nigricornis*.

Larva undescribed.

Abia ænea, flavescenti-sericea, antennis nigris, femoribus æneis, genubus, tibiis tarsisque pallide flavis, alis fusco-variegatis; maris abdomine notato macula quadrata nigra.

On the 23rd of June, 1844, I found some larvæ of a *Cimbex* which were new to me. They were discovered on *Symphoricarpus racemosus*, a neat shrub, to be met with in nearly every garden in Holland. The larvæ in question were taken in a garden at Zwammerdam.

In common with all the known larvæ of *Cimbex* they have twenty-two legs, the fourth segment alone being apodal. The head is black on the crown and gray on the under side; the back purplish gray, and divided in its whole length by two orange-coloured lines of equal width; the abdomen and legs are gray. The claws of the six thoracic legs, which have a tubercle at the base (fig. 3), are brown. Between the orange lines are twelve large dark purple spots, and between each pair of these two smaller spots there are also some small spots on either side. The elliptical spiracles (fig. 2 a) have a corneous margin, which is prolonged downwards in two diverging brown stripes. Above each of the breathing pores from the third to the ninth is to be seen, by

the aid of a lens, the opening or mouth of a duct closed by a valve, whence the larva, on being touched, discharges a colourless fluid, which I could not perceive to have any particular odour. This discharge of a fluid serves probably to defend the animal from the attacks of female ichneumons, so that I was surprised to observe that the larva did not emit the fluid every time it was touched, but allowed some time to elapse, as if it had first to awake from a half sleep.

The full-grown *Cimbex* larva is a handsome insect. When young it is gray, powdered as it were with white, having two yellow spots on each dorsal segment in place of the orange stripes; there are then four spots on the sides and one in the centre of the back. The length of the full-grown larva is 16 lines.

During the day they remain at rest on the branches or among the leaves, but on the approach of evening twilight they crawl higher up and begin to feed, gnawing the leaves from the edge towards the midrib. They are full-grown in the first days of July, and begin to spin up between the twigs and among the fallen leaves. The cocoons are hard, and made of a brown silky material. The latest larvæ which I observed to spin up made yellow cocoons.

On the 1st of April, 1845, I opened two yellow cocoons, and found pupæ (fig. 4) inside. The anterior part of the body was brownish yellow, and the abdomen green, with a rather broad brownish stripe over the back; the compound eyes brown, and visible through the outer skin; between the eyes hung the white antennæ, which are easily seen to be six-jointed; attached to and beneath the head the jaws and palpi were readily distinguished; the six legs lay with the femur uppermost, and the tibiæ and tarsi bent under against the thorax and abdomen, the last pair extending beyond the fifth segment of the abdomen, all yellowish white; the wings were concealed by the legs, and the back was bent and of a brown hue. The boring apparatus was easily recognised in both these females.

On the 20th of April these two had moulted for the last time, but for the first three days after they had not acquired the use of their legs, and lay mostly on their backs. A female made her appearance from an unopened cocoon on the 24th, and another on the 28th. These were strong on their legs from the first, but did not fly, even when placed in the sunshine. It is worthy of remark that during that year my cocoons produced females only, and that in the following year from eight cocoons I reared exclusively males. The latter all appeared in the beginning of March, which is probably to be attributed to the milder temperature. I have not found the larva since, and I never

took the perfect insect on the wing. The length of the female is 5 lines, and of the male 4 lines. They are both of a dark bronze colour, the head and thorax thickly covered with yellowish brown hairs. Antennæ black, six-jointed, the last three joints forming the club; they are a little longer in the male than in the female. As the form of these antennæ is somewhat different from that of the other species of this genus, I have given, at fig. 7, an enlarged representation of a male and female antenna. The compound eyes approach much nearer to each other on the crown of the head in the male than in the female. The abdomen is bronze-coloured, and covered with a short, shining, silky, procumbent pubescence; in the male the fourth, fifth and sixth segments have a black velvety spot in the centre (fig. 6). The legs are light yellow, having the coxæ and femora bronze. The coxæ and femora are covered with long soft black hairs; the tibiæ are armed with two spines; on the under side of each joint of the tarsi, except the last, is found an oblong sucker with a soft margin, which I have represented, enlarged, at fig. 11; the wings are yellowish, with a fuscous costal nervure; stigma brown, and a brown stripe running obliquely downwards from the costal nervure, and thence forward again to the stigma; behind this is a smoke-coloured spot. This marking is less distinct in the female: see fig. 5, and for the neuration of the wing fig. 12.

The perfect insects were very sluggish, and when in the shade remained motionless; on being brought into the sunshine they flew backwards and forwards with a heavy flight, making a humming noise. I opened a female for the purpose of examining the saw, and found that in this species its form is much the same as in the other known *Cimbices*, only somewhat less curved at the extremity (fig. 8). The edge of the saw was distinctly furnished with implanted dentate lobes, which projected considerably (fig. 9).

From the larvæ of these saw-flies were produced both sexes of *Exetastes Cimbicis*, *V. Voll.*, a new species, of which I have given a description in the 'Bouwstoffen voor eene Fauna van Nederland' (Materials for a Fauna of the Netherlands), ii. 281.

I take this opportunity of stating that a specimen of the very nearly allied *Abia fasciata*, *F.*, has been added to the collection of the Netherland Entomological Society, subsequently to the publication of the Catalogue of Netherland Hymenopterous Insects, and of the occurrence of which in this country no mention is made in the 'Bouwstoffen voor eene Fauna van Nederland.' The specimen in question was presented by Mr. Lodeesen, who, however, could not

remember whether he took it in the province of Holland, Utrecht or Gelderland. The species must be inserted between the numbers 4 and 5 in the catalogue.

NEMATUS CÆRULEOCARPUS (*Hartig*).

Imago: *Hartig, Blatt. und Holzwespen*, No. 8, p. 187.

Larva: probably that described by Dahlbom under the name of *Tenthredo crassa*, *Fallen*, in the 'Forhandlingar ved de skandin, Naturförskeres fjerde Möde,' Christiania, 1847.

Nematus niger, *nitidus*, *mandibularum* et *palporum* basi sordide rufa, *coxarum* apice, *femoribus* et *tibiarum* parte majori, *uenuon* *alarum* radio rufis, *stigmatæ* cæruleo-nigro, *cellula* lanceolata *pedunculata*.

In the month of September I found some larvæ in the wood at the Hague, on young poplars by the side of the lake. They were clinging close to the petioles of the leaves: their colour and general appearance made me think they were larvæ of *Hylotoma*. Some years after I found a similar full-grown larva on a weeping willow in the town of Leyden; and shortly after I discovered some more, in different stages of growth, on some poplars outside the town. When young they ate holes in the leaves, but on getting older they fed also from the margin towards the midrib. They attain a length of 1 inch (fig. 1), and are of a bluish green colour with brownish yellow thoracic legs; these are provided with sharp brown claws. The head is pale brown, with two darker stripes intersecting at right angles on the crown (fig. 2). The skin is so transparent that the tracheæ and their branches may be easily perceived. Two dark stripes run along the back of the larva as far as the penultimate segment; in some individuals these are only as it were indicated at either end. The skin is also irregularly covered with black spots on the sides; these spots run into lines, more especially above the legs; from each spot grows a short bristly hair. The two terminal segments are without hairs or spots, but the last has two hairy protuberances on the side, near the anus, and above these, two yellow horns tipped with red (fig. 3).

After the first moult the larva is of a darker green, with blackish brown head and dark horns above the anus.

At the end of September the larvæ spun up among the withered leaves in neatly constructed cocoons, which on being opened appeared to be double; these were coarser on the outside, and of a dark brown or deep yellow colour, on the inside finer and of a pale brown colour

or white. This shows that Hartig's assertion is incorrect, namely that the Nematæ are contained "im einfachen dichten aber nicht dicken Cocon" ('Die Familien der Blatt. und Holzwespen,' 180).

The larvæ which I had taken at the Hague appeared in the month of October of the same year; on the other hand, those which I had taken at Leyden remained over the winter, and about the end of April I found in one of the cocoons a small shining green pupa of a glassy appearance. Antennæ, palpi and legs pale green; eyes black; the ocelli were very perceptible through the outer skin. The perfect insect emerged from the pupa state in May. This difference in time can probably only be accounted for by a difference in temperature.

The perfect insects (fig. 4) are $4\frac{1}{2}$ lines long, the males somewhat less. The whole body is of a blue-black colour, very shining, the head and thorax finely punctulate. The antennæ are three lines long and black; the joints sharply divided; the palpi are brownish red at the base. The meta-thoracic spots are dirty white; in the female the abdominal segments have very narrow gray margins. The legs are red, with black coxæ; the hind legs have the tarsi and the posterior half of the tibiæ black. In some individuals the coxæ are one half yellowish red, others have the tibiæ black, with the base red. The wings are transparent, yellowish at their insertion; the nervures partly red and partly black, with a large bluish black stigma; the nervure between the first and second submarginal cells is almost always merely indicated. The perfect insects seldom appear, at least I have rarely observed them, and Dr. Hartig has seen only one specimen, which was minus the hinder tarsi.

I have examined the parts of the mouth of this species of Nematæ. The labrum (fig. 5) is broad and but little protuberant, but has a semi-circular appendage; the mandibles (fig. 6) are broad and short, curved, with a sharp-pointed apex and a small tooth in the middle; the maxillæ (fig. 7) are corneous, with a membraneous discoidal apex, and a sharp-pointed membraneous appendage on the inside; externally are the five-jointed maxillary palpi, the third joint being the longest and thickest; the labium (fig. 8) is quadrate, but rounded at the apex, with three processes, of which the middle one is very narrow; on each side is a palpus consisting of four joints, of which the second is the thickest, the terminal joint is abruptly rounded off.

The abdomen of the male (fig. 9), has an oval plate on the seventh segment. The edges of the corneous plates of the dorsum of the abdomen extend some distance over the ventral plates, so that they are always visible on the under side.

An enlarged view of the saw and ovipositor of the female is given at fig. 10; the saw is lighter in colour, and has teeth on its free edge arising from the projecting margin of its divisions. The ovipositor itself is curved, and, as well as the saw, is traversed by diagonal lines, giving it the appearance of being divided into separate plates.*

Habits of Nyssia zonaria, and Offer of Specimens.—*Nyssia zonaria* is very abundant this spring: I have taken it in great numbers and fine condition during the last two weeks, and shall be happy to distribute my duplicates at the close of the season, if those in want of the insect will apply to me. It is an extremely sluggish insect during the day, sitting motionless on the sand and feigning death when touched: the males are mostly found partially concealed behind the tufts of grass which dot the sand-hills; about sun-set they wake up and buzz rapidly over the sand in search of the apterous females, which are strewn about, without the smallest attempt at concealment, in such numbers that they might be picked up and measured like shrimps, by the quart. At present I am only acquainted with two spots on the Cheshire coast where *N. zonaria* occurs, but no doubt there are many others which will be stumbled on accidentally, as these were. The sedentary habits of the female necessarily tend to localize the insect. Both the known stations are little hollows among the sand-hills of perhaps an acre in extent, outside of which not a specimen is to be found, and the keenest collector might pass within half a dozen yards of a spot where they are sitting on the sand by hundreds, and not see one. The larva is found from May to August, feeding on yarrow and dwarf sallow.—*Edwin Birchall; Oakfield Villa, Birkenhead, April 4, 1861.*

Larva of Anticlea berberaria.—I have often found the larva of *Anticlea berberaria*, in this neighbourhood, feeding upon *Berberis vulgaris*; but none that I have had agree with Mr. Newman's description of it (Zool. 7361), either in colour, habits or food-plant. Mine were rough, and speckled with red-brown and gray; but as I cannot from memory give a sufficient description of them, I shall be happy to forward some this season. I find them at the end of June, and again in September; the imago in May and August. Thinking there is some mistake in the name of the larva is my apology for writing this note.—*Thomas Brown; 13, King's Parade, Cambridge.*

[I shall be extremely obliged for the larvæ so kindly offered: with regard to my mistake, I believe I shall be able to give the correct name to the larva I described as that of *Anticlea berberaria*: many thanks for this correction.—*Edward Newman.*]

Oviposition of Xanthia ferruginea.—At the end of October I succeeded in getting a few eggs from a female taken at sugar. When first laid they were lemon-colour, but soon turned reddish. They were kept in a cool, rather damp room, and hatched

* M. Snellen van Vollenhoven has informed me that since the above was written the imago of this insect has appeared with him on the 3rd of April, and that the larva has again been met with on willows.—*J. W. M.*

March 3. The larvæ are feeding well upon the flowers of the wych elm (*Ulmus campestris*).—*H. Harpur Crewe*; *Drayton-Beauchamp*, March 25, 1861.

Oviposition, &c., of Thera juniperata.—During the month of October, 1860, I took several females of this insect. One of them deposited about a score of whitish yellow eggs, on a sprig of juniper. These I kept all the winter in a cold room without a fire. They hatched March 16—20. The young larvæ are feeding well upon the buds of the wild juniper.—*Id.*

Economy of Micropteryx semicuprella.—The larva lives in young hazel-leaves, making brown mines, which are at first serpentine, of gradually increasing breadth, and always close to the margin of the leaf. At the middle or end of May it descends to the earth, and the perfect insect is produced in the following April. Larva 2 lines long, apodal, slender, almost cylindrical, gradually tapering from the slightly broader pectoral segments. The colour is yellowish white, with the alimentary canal showing through green. The skin is naked; under a lens it appears almost granulated: on each segment is a smooth transverse fold. Head brown, very small, with white bristles; jaws squarish, with four blunt little teeth on the “kaufäche:” prothorax with two brown spots beneath; above with four small brown blotches placed in a curve; anteriorly it appears rather darker from the retracted head showing through. On the sides of each of the abdominal segments is a small raised spot, uncoloured, directed externally, and furnished with a short hair, and near it, more towards the under side, two small bristle-like hairs are perceptible. Anal segment cylindrical, with two bristles projecting backwards.” — *Kaltenbach*, as translated by *Mr. Stainton* in the ‘*Intelligencer*,’ x. 16.

The Emerald Wing.—Between the little river which runs through the plain at the head of the Bay and the stony, rank, weed-grown little hills on the right, is a narrow grassy strip, thickly studded with the green culms and broad white umbels of a gigantic species of *Archangelica*, and where *Solomon’s-seal*, and *Trollius orientalis* grow in the wildest profusion. A long gray *Lixus* bores into all the stems of the *Archangelica*, drilling round holes with his cylindrical snout. Here *Buckley* finds an emerald wing. It is the elytron of a genus of *Buprestidæ*, and is greatly admired by the coleopteromaniacs. Every man of them is desirous of obtaining the perfect insect. Some go north and some south; the plains are scoured, the mountains climbed, and the valleys searched in vain. “’Tis not in mortals to command success,” but I think it rather hard that unsuccessful efforts are usually consigned to oblivion. The results so triumphantly set forth,—the new genera discovered, and the beautiful forms for the first time brought to light by the insect-net or the dredge,—are very gratifying, and are duly recorded; but who shall chronicle the failures,—the keen disappointments; the labour thrown away, and the energy and enterprise fruitlessly expended; the tons of mud sifted, the bushels of sand examined, the huge stones upturned, and the bushes beaten in despair; no fragment to kindle hope, no beetle to reward the patient enthusiast. *Collinson* the indefatigable is seen severely scrutinizing the fissured bark of old trunks and the sound bark of stately trees, peering, like a jackdaw, into rotten wood, or scratching up the earth like any terrier anxious about a rat. On a sudden he rivets his inquiring gaze on a young oak, and gives an apology for an Indian war-whoop; for he sees the owner of the emerald wing sunning himself on the tender green surface of a leaf. I remember a great hunt for another emerald beetle (*Drypta emarginata*), with old *Turner*, in Hampshire, at pretty *Alverstoke*. In vain we toiled and tore up the grassy bank; the old man growled and swore in a deep

undertone at *Anchomenus prasinus*, which was always running out, giving him false hopes. At length he finds a veritable Drypta. Drawing a long breath he exclaims, this time aloud and jubilant, "Glory, &c. &c. &c. ! I got 'un!"—*Arthur Adams ; St. Vladimir Bay, Manchuria.*

Notes on two New Brachelytra.—I have taken and determined two Brachelytrous insects which I believe have not yet been recorded as British.

1. *Oligota apicata*, Erichs. It belongs to the ovate section, averages about half a line in length, and is at once distinguished from all its British congeners by the two last joints of the abdomen and the legs being a clear fulvous-yellow, and by the two first joints of the antennæ being much longer than the succeeding ones, but the second about the same length as the first. I took eight specimens from the *débris* of fern, in an old shed at the Holt Forest in Hampshire, on the 1st of April, 1861. The insect is remarkable for the cool and deliberate way in which it slowly marches over the paper on which the "shakings" are placed. Erichson says he has taken one specimen only.

2. *Bledius crassicollis*, Erichs. It belongs to the section which has thorax and head unarmed, and is the only British species, I believe, which has a smooth space and no furrow along the middle of the thorax, which is also strongly punctured. My specimens have all testaceous-red elytra, with a darkish stain near the scutellum. The elytra are coarsely punctured. The abdomen is black, with testaceous apex. It is a small species, about the size of *B. unicornis*, larger only than *B. arenarius*, of those which I possess, averaging $1\frac{3}{4}$ line. I took many specimens from a sandy bank near Walmer, on the 8th of August, 1857, and have given them away as *B. crassicollis*, but have never published any account of the insect. I have seen none but my own specimens.—*John A. Power ; 52, Burton Crescent, April 17, 1861.*

Captures of Coleoptera at Sanderstead.—On the 24th of March we spent a most pleasant and profitable day at Sanderstead Downs, near Croydon. Among a whole host of common things we found the following:—*Panagæus quadripustulatus* (5), *Mycetophorus splendidus* (12), *M. angularis* (1), *M. punctatus* (2), *M. splendens* (1), *Bolitobius analis* (5), *Acidota cruentata* (1). On the 6th inst. we again took two more *P. 4-pustulatus*.—*A. & M. Solomon ; 16, Graham Villas, Pownall Road, Dalston, April 19, 1861.*

Capture of Meloe cicatricosus.—On the 14th of April I captured twenty fine specimens of this insect at Ramsgate.—*A. Solomon.*

Plague of Ants in Honduras.—As for the ants, their name is legion. I do not know whether they should be called buccaneers or filibusters, but they appropriate everything they can get at, and locate themselves everywhere. They are wonderfully industrious in carrying out their predatory views, and display a great contrast to the inhabitants of Honduras, who do not know what industry means, and abhor continuous labour. There are two colours of ants, black and red, and a great variety of sizes. Some of the large black ones are half an inch long ; those in the houses are generally of the smaller sizes. Every tree and bush is infested with some kind or other of them. If you shoot a bird and do not speedily pick it up it will be covered with them ; if you lay a bird down for a few minutes, beware how you take it up, for if you do so incautiously they will be on your hand in no time, and resent your claiming your own by instant biting. They are most savage little wretches when interfered with or molested. Take care also how you sit down, either in the forest or anywhere out of doors, or you may jump up again quicker than pleases you. The house we occupied at Comayagua was overrun by ants. They were constantly occupied in

excavating the walls and depositing the earth in the shape of pills in large heaps on the floor below. Nothing would stop them; gunpowder was tried, and arsenic mixed with sugar was poured down their holes, but to no purpose; still the mining went on: the tables and food were overrun, and the latter damaged by them; they got into tea, beer, wine, and everything else that was left exposed; if a piece of bread, meat or fruit was left on a table for an hour or so, they would find it out and would soon be seen in a long stream passing to and fro over the floor and up the legs of the table. The only way we could keep our bread from them was by putting it in a basket suspended from a beam by a single string. I was obliged to do the same with the birds shot, for if left on a shelf or table the ants would quickly find them.—*G. C. Taylor, in 'Ibis,'* ii. 21.

Australian Ants burying their dead.—One very hot and cloudless day, when not a breath of air stirred the leaves, my eldest boy (four years old), coming up from the beach, fatigued and hot, threw himself on a grassy mound near where I was sitting, and remained quietly enjoying the rest, and anticipating the pleasure he would have in showing to his sister the pretty shells and corals he had found. I was startled by a sudden scream, such as one only gives when in terrible pain. A snake was my first thought, and in horror I went to the child; but was at once reassured on seeing him covered by "soldier ants," on whose nest he had unwittingly lain down. Some of the insects still clung on with their forceps, and stung my poor boy, who roared with pain at every fresh attack, whilst I killed them as fast as I could, assisted by the nurse. At length all were removed, about twenty being left dead on the ground. Going to see the little fellow bathed with something to ease the pain, I was absent about half an hour, and then returned to the same place, when I saw a large number of the ants surrounding the dead ones. Being fond of Natural History, and having read much concerning the instinct of ants, I determined to watch them closely now. At last four ran off very quickly, and I followed them until I saw them enter a hillock containing an ants' nest, which we had in vain tried to get rid of on account of the annoyance caused by their close vicinity to our sitting-tent. They remained here about five minutes, when a number more came out two by two, and proceeded slowly to the place where their dead companions lay. Here they seemed to wait for something; and presently we saw coming from the other side, near the creek, a number surpassing those I had followed, and halting in the same place. Then two ants took up one of the dead ones and marched off, followed by two others as mourners; then two others entered the procession with a second dead ant, succeeded, in the same way, by another pair, and so on, until all the dead were taken up—a number of, I should think, two hundred bringing up the rear. Following the train, I found that the two empty-handed followers relieved their fellows in advance, the latter falling behind in the place of those who relieved them, and thus continuing to alternate from time to time. They had now gone a considerable distance towards the sea-side, when they stopped at a sandy hillock, where those who marched in the rear of the procession commenced operations by making holes; but I soon observed that only about half the number took part in this employment. When a sufficient number of graves had been dug, the dead bodies were laid in them, and I found that those ants which had hitherto stood idle were deputed to cover them in. About six would not stir from their places, and on these the others fell and killed them; whereupon they made a single large pit at a distance from the other graves, into which all the six were put and duly covered up. The ants then all paired off and marched back to the scene of slaughter,

where they remained together for a few minutes, when each company left for their own habitation. The observation of this curious proceeding gave me great pleasure; and I had frequent opportunities afterwards of seeing the insects act much in the same way. If one of the "workers," however (who are much smaller than the rest), were killed, it was buried where it fell, and no friends attended the funeral.—*Mrs. Lewis Hutton, in 'Proceedings of Linnean Society,'* Vol. v. No. 19, p. 217. [I may say that had this communication reached my hands through any ordinary channel I should have respectfully declined it as a hoax; but, seeing it has received the *imprimatur* of those athletes of Science who decide on the propriety of publishing or rejecting the communications transmitted to the Linnean Society, I have no choice but to accept it as veracious. I would, however, caution my younger readers from drawing any inferences as to the habits of ants in general, or even of Australian ants in particular, from the remarkable fact here related of an individual nest.—*Edward Newman.*]

The Wreck of the Medusa.—Fleecy white clouds sail softly across the pale blue sky, and a single skylark sings clear and loud overhead. From the bay on the south side of the Cape I pass to the bay on the north side. I reach a sandy down, where many flowers remind me of home and "Merrie England." I see *Erodium maritimum* and *Linaria vulgaris*, but not the "wee modest crimson-tipped flower" we all love so well; in its place is *Dianthus chinensis*; this is everywhere, so is a pretty *Campanula*; and springing up in dry stony places are the spikes of a white-flowered *Sedum*, looking just like a pigmy *Aloe* in a pigmy desert. Grasshoppers leap up around me in prodigious numbers, and among the stunted shrubs slowly stalks the grass-green Mantis. The humming-bird hawk-moth hovers around the spikes of the *Sedum*, and flitting about are painted lady and clouded yellow butterflies. On turning the stones we find a bronze *Chrysomela*, an *Opatrum* and an *Akis*; *Cymatia* runs rapidly out, and there is generally a dark *Lithobius*. We come now to the edge of an abrupt, broken, yellow-fronted cliff, whence issues the harsh, grating song of the Cicada, and where, flying backwards and forwards, are the blue rock-pigeons. We descend the cliff, and before us is a blue bay with blue hills in the distance. Around us are brown, flat-topped and angular rocks, bristling with black patches of juvenile mussels, and rough with white patches of juvenile barnacles. In the little pools crawls *Lampania zonalis* the ubiquitous, and therein disport lively, big-headed gobies and the sly, artful blenny. Here also are seen running about, in a busy, cheerful, bustling manner, the beautiful golden plover, the red-billed oystercatcher, the greenshank and the sanderling. We are now on the "lean ribbed" sand, a tawny waste extending right and left for miles. The spotted teal are feeding at the margin of the water; but what is that mysterious object rolling and tumbling in the ripple of the tide? It is an immense *Rhizostoma*, stranded and helpless, at the mercy of the waves. It is certainly the biggest jelly-fish I ever saw, measuring three feet across the disk. The unfortunate *Medusa* is not only wrecked, but eaten. Chinamen come down, like Riff pirates or Cornish wreckers, to the scene of the disaster, and cut off huge slices of the firm translucent blubber, and, carefully wrapping them in clothes, carry them away for gastronomic uses. Doubtless their insipid mess of boiled rice is greatly improved thereby at evening "chow-chow." This is the only instance I have known of any of the *Acalephæ* being used as food.—*A. Adams; Cape Vansittart, Gulf of Lian-tung.*

The Range of Echinoderms in Depth and Space.—The following notes on the geographical and bathymetrical distribution of the genera of Echinoderms dredged by me in the Yellow Sea and the Sea of Japan may be useful to those especially engaged in the study of sea-urchins and starfishes:—

A. KOREAN ISLANDS.

Haul 1.—Quelpart Island; seven miles from the shore. Fifty-four fathoms. Black sandy mud. Echinus, Echinorachnius, Ophiura, Ophiocoma, Sipunculus.

Haul 2.—Port Hamilton, Korean Archipelago; half-a-mile from the shore. Ten fathoms. Black sandy mud. Echinus, Echinorachnius, Scutella, Astemia, Sipunculus.

Haul 3.—Chosan Harbour, Korean Peninsula; four hundred yards from the shore. Six fathoms. Mud. Thyone and Sipunculus.

Haul 4.—Chosan Harbour; three hundred yards from the shore, in a tideway. Two and a half fathoms. Sandy mud and weeds (*Zostera* and *Sargassum*). *Asterias* and *Cribella*:

Haul 5.—Straits of Korea. Two hundred and eighty-eight fathoms. Rocks and sand. *Ophiocoma* (several living specimens).

B. COAST OF MANCHURIA.

Haul 1.—Off Sunday Island; half a mile from the shore. Twenty fathoms. Sandy mud. Echinorachnius (dead), *Pentacta* and *Bolinus*.

Haul 2.—Off Castle Point; a mile from the shore. Thirty-seven fathoms. Rounded pebbles and broken coral. *Cribella* and *Ophiocoma*.

Haul 3.—Sio-Wu-hu Bay; fifty yards from the shore. Four fathoms. Stones and sand. *Sipunculus*, *Cribella*, *Ophiura* and *Asterina*.

Haul 4.—St. Vladimir Bay. From three fathoms to low water. Rocky bottom. A deep blue *Asterina* with a centre of dull red; a little *Palmipes* abundant in the rock-basins.

C. JAPANESE ISLANDS.

Haul 1.—Off Okosiri Island; six miles from the shore. Twenty-five to thirty-five fathoms. Coral and rocky bottom. *Cidaris*, *Echinus*, *Solaster*, *Cribella*, *Ophiocoma*, *Pentacta*, *Psolus* and *Sipunculus*.

Haul 2.—Off Rifunsiri Island; four miles from the shore. Thirty-five fathoms. Coral, broken shells and stones. *Solaster*, *Cribella*, *Ophiocoma*, *Psolus* and *Holothuria*.

Haul 3.—Amiva Bay, Island of Sagaleen; three miles from the shore. Seventeen fathoms. Stones and gravel. *Solaster*, *Uraster*, *Cribella*, *Ophiura*, *Echinus*, *Psolus* and *Thyone*.

Haul 4.—Amiva Bay; two miles from the shore. Twenty-three fathoms. Soft black mud. *Spio*.

Haul 5.—Sea of Okhotsk; seven miles from the Island of Yesso. Seventeen fathoms. Dead shells and sand. *Asterina*, *Cribella* and *Ophiocoma*.—*A. Adams*.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

April 1, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:— ‘Smithsonian Contributions to Knowledge,’ Vol. xi.; ‘Instructions in reference to collecting Nests and Eggs of North-American Birds,’ ‘Catalogue of the described Lepidoptera of North America,’ prepared for the Smithsonian Institution by John G. Morris; presented by the Smithsonian Institution. ‘New Genera and Species of North-American Tipulidæ with short Palpi, with an Attempt at a new Classification of the Tribe,’ by Baron R. von Osten-Sacken; by the Author. ‘Journal of the Proceedings of the Linnean Society,’ Vol. v. No. 19; by the Society. Leydig’s ‘Natural History of the Daphnidæ—Reviewed by J. Lubbock, Esq.’; by the Author. ‘On Sphærulearia Bombi,’ by John Lubbock, F.R.S., F.L.S., F.G.S.; by the Author. ‘Exotic Butterflies,’ Part 38; by W. W. Saunders, Esq. ‘The Zoologist’ for April; by the Editor. ‘The Journal of the Society of Arts’ for March by the Society. ‘The Entomologist’s Weekly Intelligencer,’ Nos. 231 to 233; by H. T. Stainton, Esq.

Election of a Subscriber.

Aaron Solomons, Esq., of 16, Pownall Road, Dalston, was elected a Subscriber to the Society.

Exhibitions.

Mr. F. Smith exhibited a number of *Myrmedonia funesta* and other Coleoptera, found in a nest of *Formica fuliginosa* at Earith.

Mr. Fereday exhibited some specimens of *Nausibius dentatus*, *Marsham*, bred from the fruit of *Dimocarpus Litchi* of China.

Dr. Knaggs exhibited a small mutilated larva, apparently lepidopterous, respecting which he communicated the following:—

“A medical friend was called to see a child, ten years of age, who was suffering from vomiting of blood and passage of blood by stool. On examination of the pharynx he observed that blood was trickling from the posterior nostrils; during the examination the child expressed an inclination to sneeze, upon which a white pocket handkerchief was applied, in order to see if any blood was thereby ejected; there was, however, nothing but mucus and the small larva produced, which was alive at the time, but had since been crushed by accident.” Dr. Knaggs observed that instances of insects being ejected from the nostrils by sneezing had been previously recorded in the ‘Proceedings’ of the Society. The injured larva he now exhibited was probably that of *Endrosis fenestrella*, a very common species everywhere in houses; and he considered it not impossible that it was on the handkerchief before the sneezing took place.

Mr. M'Lachlan exhibited specimens of a trichopterous insect new to Britain, the *Goniotaulius concentricus*, *Kolenati*, not *Phryganea concentrica*, *Zett.*; *Stenophylax vibex*, *Brauer*, not of Curtis. Of this species about a dozen specimens were taken in 1860, near Ranworth, by Mr. Winter; it is a common species on the Continent, and

variable, the typical specimens from Russia being smaller and darker than those of Western Europe.

Mr. Stainton exhibited cases of two species of the long-horned moths. One case, which belonged either to the genus *Adela* or the genus *Nemophora*, was composed of several pieces of brown leaves added in succession: the larvæ inhabiting this sort of case were feeding on withered oak-leaves. The other case, which probably belonged to the genus *Nemotois*, was formed by successive additions around a brown oval nucleus, and was much contracted in the middle: the larvæ inhabiting this case were feeding on the green leaves of *Ballota nigra*. The *Adela*? cases were found by Mr. Healy, at West Wickham, by searching amongst the fallen oak-leaves. The *Nemotois*? cases were collected by Herr Schmid, of Frankfort-on-the-Maine, around plants of *Ballota nigra*, the lower leaves of which were much eaten by them.

Mr. F. Walker exhibited a large box of North-American Hemiptera, and made the following remarks, which occurred to him while inspecting this collection:—"It is well known what a great affinity part of the fauna of North America bears to that of Europe; and this likeness between the two faunas increases northward until they become nearly identical; and there are indications that the separation between the eastern and western continents took place at a later period in the northern regions than in the southern regions. The separation between the northern fauna and the southern fauna is much less complete in the western countries than in the eastern countries; and this is owing to the divisions in the latter by means of seas and mountains, which are comparatively wanting in the western continent. The fauna of the Central States of North America and that of the eastern slope of the Alleghany mountains appear to be equally similar to that of England; and in the plains of the United States the faunas of the north and of the south are comparatively mingled together, whereas in the regions of the Old World they are nearly separate, and in the southern part the northern fauna only appears on the mountain ranges. I will conclude by enumerating a few of the species in this box which appear to be most nearly allied to the British Hemiptera, or to be identical with them:—

<i>Coremilæna unicolor</i>	<i>Tingis hyalina</i>
„ <i>pulicaria</i>	<i>Reduvius personatus</i>
<i>Ophthalmicus niger</i>	<i>Nabis ferus</i>
<i>Anthocoris pseudo-chinche</i>	<i>Hebrus americanus</i>
<i>Neides spinosus</i>	<i>Gerris apterus</i>
<i>Lygæus linearis</i>	„ <i>marginatus</i>
„ <i>bioculatus</i>	<i>Ranatra fusca</i>
<i>Eurymerocoris nigrutilus</i>	<i>Corixa annexa</i>
<i>Rhopalus maculigerus</i>	<i>Aphrophora quadrinotata</i>
<i>Sulda læta</i>	<i>Psylla diaphana</i>
<i>Zosmenus latus</i>	

The American *Reduvius personatus* seems to be sufficiently distinct from the British species to be entitled to receive a new name.—*E. S.*

NORTHERN ENTOMOLOGICAL SOCIETY.

March 16, 1861.—C. S. GREGSON, Esq., President, in the chair.

A vote of thanks to the late President, B. Cooke, Esq., was accorded with great cordiality.

Exhibitions.

By Mr. Hague. *Noctua ditrapezium*, from Conway (see Intel. No. 230).

By Mr. Harrison. *Miana captiuucula*, *Tr.*, captured by himself at Warbrick Moor, near Liverpool.

By Mr. Gregson. *Lithosia caniola*, from his cabinet; taken by himself, July 12 to August 2, 1856, and 1857, in Cheshire, where it was not scarce. He also exhibited specimens of *Dianthœcia* ——? taken by Messrs. Tiltman and Nicholson, on the coast of Cumberland; a singular variety of *Arctia caja*; *Arctia Menthastri*, *var. Walkerii*, presented to him by Mr. Tiltman; and a series of varieties of *Dianthœcia carpophaga*, from light buff to reddish brown.

By Mr. Miller. A singular variety of *Chrysophanus Phlæas*.

By Mr. Hodgkinson. *Coleophora murinipennella*, bred near Preston; a singular variety of *Arctia caja*; and a series of *Grapholita nisana*? fed on white poplar. This insect never varies like the willow-catkin feeder, but is always a dull greenish drab.

By Mr. Greening. Pupa of *Anthocharis Cardamines*, the larva of which had fed upon *Leguminosæ*; a fine series of *Leucophasia Sinapis*, *Lin.*, and a fine series of *L. Sinapis*, *Haworth* (*Leptoria candida*, *Westwood & Humphreys*, plate 6, fig. 11).

The President also exhibited fine series of these two species of *Leucophasia* (British), and a number of foreign specimens of the same genus, including *L. Lathyri*, *Dup.*, *Erysimi*? *Bork.*, &c., from Switzerland, Bavaria and France, illustrative of a paper he read upon the genus *Leucophasia*, which paper was further illustrated by a series of lithographic figures he had drawn and printed for distribution amongst the members.

The President likewise exhibited a box of curious varieties of *Abraxas ulmaria*, recently added to his collection. One of them, obtained from Mr. J. Blakeley, has one fore wing dark and unicolorous, the other singularly white.—*G. H. W.*

Case of Butalis incongruella found on Birch.—A case of this species has been sent to me for determination by the Rev. H. Burney, who found it on a birch-tree in Cannock Chase.—*H. T. Stainton* (in the '*Intelligencer*'); April 22, 1861.

Elachista Larvæ.—From Professor Fritzsche, of Freiburg, I have just received two packets of *Elachista larvæ*; those on the *Agrostis stolonifera* were already in pupa, possibly they may be *E. subnigrella*; those on *Poa compressa* with black heads and black marks on the second segment, appear to be *E. Gregsoni*. It is very pleasant to find that *Elachista*-hunters are now at work in Saxony.—*Id.*

Notes on the Birds of Belgium. By HENRY L. SAXBY, Esq.

NOT having access to any work upon the Ornithology of Belgium, I must confess that in at length bringing forward my own rough notes upon the birds of that country I do so with some misgiving, lest I may be falling into an error which it has always been my endeavour to avoid, one which must be too evident to the misguided few who, under the supposition that they have been exploring a region previously unknown to naturalists, have too hastily resorted to quill and foolscap, without due regard to the merits of those who have perhaps made the Natural History of that very spot the study of a lifetime.^a With very few exceptions, these notes are the result of my wanderings in Belgium, and more particularly in South Brabant, in the years 1852-3. Several rare species having occurred only in the markets, I have placed an asterisk before their names, signifying their doubtful right to occupy a place in the following list.

Kestrel (*Falco tinnunculus*). Permanent.

Sparrowhawk (*F. nisus*). Permanent, but not so abundant as the preceding species.

Buzzard (*F. buteo*). Rarely seen. I have in my possession several eggs said to have been taken near Tirlemont.

Hen Harrier (*F. cyaneus*). Permanent?

Ashcoloured Harrier (*F. cineraceus*). Rather scarce. About the end of May or the beginning of June it makes a nest of small sticks, wool and dry grass, gathered carelessly together upon the ground: the female usually lays four eggs, which are white and of a roundish form.

*Scops Eared Owl (*Strix Scops*). I saw one alive in the Brussels market on the 11th of April, and another a few weeks later. It is a very handsome bird, considerably less in size than the little owl, and far more lively. The first one soon died, but the other lived for thirteen days, feeding chiefly upon raw flesh. Upon one occasion I offered it some "blue-bottle" flies, which it eagerly swallowed: it also looked keenly at any which chanced to settle near the cage, but

^a I fear my correspondent has fallen into the very error he so justly condemns: has he not overlooked the very complete and elaborate List of the Birds of Belgium published by a resident naturalist, M. Julian Deby, in former volumes of the 'Zoologist.' See Zool. 813, 858, 933, 979, 1019, 1070, 1131, 1187, 1251, 1462 and 1528.—*E. N.*

I never observed it attempt to seize one. About noon it usually became very restless and irritable, ruffling its feathers, continually changing its position, and snapping snarily at any one who tried to handle it, though at other times such an act was not easily provoked.

Longeared Owl (*S. otus*). Permanent.

Shorteared Owl (*S. brachyotos*). I only saw it in spring and autumn, but it is said to remain to breed.

Barn Owl (*S. flammea*). Permanent and abundant.

Tawny Owl (*S. aluco*). Unfledged young were in the market as late as August.

Little Owl (*S. passerina*). Common. Between the months of March and October I seldom passed through the market without seeing several living specimens, often as many as a dozen at one time. The first eggs that I obtained were taken on the 15th of May, from a hole in a wall, about thirty feet from the ground. They were half-buried in a quantity of dust, composed of dry mortar and the castings of old birds. It sometimes rears two broods in a season, laying only two eggs each time. These are white, and in many instances nearly round: the texture of the shell is as coarse as that of an egg of much greater size. This bird is said to bear confinement tolerably well, but of those kept in cages I never saw more than five which lived as many months. They were fed upon raw flesh and small birds, and also upon mice when they could be procured. The manner in which it is employed as a decoy for small birds is still unknown to me, but I seldom saw a bird-catcher going out to his employment who was not carrying a little owl with him. Fresh specimens have the bill tipped with red, but this colour disappears as the skin dries.

*Tengmalm's Owl (*S. Tengmalmi*). I never saw more than three, and they were brought to the market in April and May. No amount of care and attention could keep them alive; they soon died, although they took food readily. At a distance this bird may easily be mistaken for the little owl, which (so far at least as I can ascertain) it very much resembles in its habits.

Ashcoloured Shrike (*Lanius excubitor*). On the 13th of March I observed one lying dead at the bottom of its cage in the market-place opposite the Hotel de Ville. Upon dissection it proved to be a female. The stomach contained the remains of large beetles, thus proving the bird to have been very recently captured.

Redbacked Shrike (*L. collurio*). Summer. One nest in my possession is composed of the usual materials, but upon the outside there are great numbers of the skins of small hairy caterpillars: probably

they had been cast up by the birds, only they were lying singly, and were pretty regularly distributed all round.

Woodchat Shrike (*L. rutilus*). A common summer visitor, arriving early in April, and taking its departure about the middle of September. For some weeks after its arrival it may frequently be seen near the outskirts of the Forest of Soignies, rapidly flitting from tree to tree, now and then alighting for a few seconds to pick up a large insect, and continually uttering a loud single note, not very unlike that of a chaffinch. Upon the approach of the breeding-season it retires further into the woods, where it builds its large and ill-concealed nest upon the branch of a tree, at the distance of some yards from the ground. On May 7th I discovered the first nest, which I frequently revisited until the young were fledged. Though rather large, it was neatly and compactly made of sticks, grass, wool and a few fibrous roots, and lined with fine grass intermixed with a large quantity of wool. The eggs were very similar to those of the redbacked shrike. Incubation continues for about sixteen days, during which period, but more especially in the early part of the morning, the male may occasionally be seen upon the eggs. I once observed a male constructing a second nest within a few feet of the one in which the female was sitting. The young, a little before they leave the nest, slightly remind one of young skylarks in colour, but at any distance they may be recognized by their white scapulars. I have never yet succeeded in discovering the remains of other birds near the nest of the woodchat, nor have I found anything but insects in its stomach; but that it really does occasionally kill and devour small birds has been satisfactorily proved by more careful observers than myself. My belief in this is strengthened by the fact of my having seen it fix small birds and pieces of meat between the wires of its cage, the more easily to be able to tear them, just as though it were well accustomed to the management of so large a prey. Woodchats being constantly exposed for sale in the markets, I had no difficulty in procuring specimens. Among eleven females examined by me there were no less than two in male plumage, the ovaries, &c., being, so far as could be ascertained, in their normal state. The plumage of one was precisely similar to that of an adult male, while that of the other only differed in the slight rusty tinge upon the sides and upon some of the outer tail-feathers. Such instances, however, are far from being of frequent occurrence, as several bird-stuffers have assured me. The remarks made by Yarrell (vol. i. p. 165) upon the changes of plumage in the redbacked shrike may perhaps be applied with equal truth to the woodchat.

Spotted Flycatcher (*Muscicapa grisola*). Summer. I have known it return to the same nest for two years in succession. The young of the first brood are able to fly early in July.

Pied Flycatcher (*M. atricapilla*). Arrives in April, remaining until the beginning of September. I found several nests, one of which was in an old decayed beech-log lying at the foot of a wall: the bottom of the nest was not more than eight inches from the ground. All the others were in small hollows in the trunks of trees, one being in the deserted nest of a woodpecker. The young are hatched in June, and when fledged are brought in large numbers to the markets. It is probably owing to the difficulty experienced in supplying them with their natural food that they so soon die when confined in cages. At all times they seem to be fond of finely-chopped raw meat.

Missel Thrush (*Turdus viscivorus*). Permanent, but rather scarce.

Fieldfare (*T. pilaris*). Winter.

Song Thrush (*T. musicus*). Permanent

Redwing (*T. iliacus*). Winter. I procured one specimen in which the back was nearly covered with large white spots.

Blackbird (*T. merula*). Permanent. Pied varieties are frequently to be seen in the shops.

Ring Ouzel (*T. torquatus*). Occasional. Three individuals obtained from the same shop had their stomachs distended with small shells, to all appearance a species of *Clausilia*.

Golden Oriole (*Oriolus galbula*). Summer. Said to be common in some seasons and scarce in others. Eggs were brought to me on the 23rd of May. The nest containing them was found in a tall birch tree in the Forest of Soignies, partly suspended from, and partly resting upon, the fork of a small branch. The outer part was made of wool, long grass and fibres of roots, the lining consisting of fine flowering heads of grasses; the sides were so firmly bound and twisted round the fork of the branch that the latter had to be cut away in order to avoid injury to the nest. In form the nest was rather wide, but scarcely so deep as the peculiarity of its situation would have led me to expect. The eggs were white, faintly tinged with pink, spotted, but rather sparingly, with dark purplish brown and reddish gray. It is probable that two broods are sometimes reared in a season, for I have seen unfledged young both in June and in August. The stomachs of recently-killed specimens contained small insects, and sometimes a few berries.

Hedgesparrow (*Sylvia modularis*). Permanent.

Robin Redbreast (*S. rubecula*). Common, but neither so familiar nor so abundant as in England.

Bluethroated Warbler (*S. suecica*). In private collections I have not only seen the bird itself, but also its nest and eggs, labelled as having been taken in Belgium. I never had the good fortune to meet with it in its wild state, although it is said to be a regular summer-visitor.

Redstart (*S. phœnicurus*). Common. Summer.

Black Redstart (*S. tithys*). Occasional. In 1853 an English gentleman, then residing in Brussels, kindly presented me with the nest and eggs of this rare bird, taken by himself, in the summer of the previous year, near Etterbeck. The nest, which was not discovered until the bird was seen to fly out of it, was situated near the top of a large heap of old paving-stones by the road-side; it is rather loosely constructed of dead grass-stalks, moss and a few dead leaves, and lined with fine grass and horsehair. The eggs, four in number, are white and slightly glossed.

Whinchat (*S. rubetra*). Abundant in low meadows during summer. I remember seeing fresh eggs and well-fledged young within the same week.

Wheatear (*S. œnanthe*). Summer. Less numerous than the whinchat.

Grasshopper Warbler (*S. locustella*). In the collection of M. C. Dubois, of Brussels, I observed several specimens, and also a nest of young birds, all of which had been taken in South Brabant.

Sedge Warbler (*S. Phragmitis*). Summer.

Great Sedge Warbler (*S. turdoides*). By no means uncommon in summer, frequenting most seed-beds, canals and sides of rivers, where coarse herbage or low willows afford it sufficient cover. Referring to my note-books for 1853, I find the following entry:—"May 22nd. Walked along the banks of the canal in the direction of Vilvorde. While stooping to pick up an insect my attention was suddenly attracted by the loud notes of some unknown bird close beside me, and immediately afterwards I caught a glimpse of the bird which was uttering them, and which I rightly conjectured to be a 'reed thrush.' It would not take wing, but continued dodging and hiding among the reeds in a most amusing manner, at frequent intervals making known its whereabouts by its harsh, scolding notes, not a little like those of the whitethroat, only of course much louder. Suspecting that the nest must be somewhere near, I continued to turn aside the reeds with a fishing-rod, until my trouble was rewarded by the sight of a nest,

though to all appearance an old one, far out of reach. Accompanied by L—, I hastened with all speed to the ferry; and having procured the assistance of the boatman, we soon had the satisfaction of taking our first reed thrush's nest. Though having a somewhat weather-beaten and untidy appearance, it was nevertheless a new one, and contained three eggs. It was firmly built round the stems of the reeds, and was composed of dry leaves of the reeds themselves, which gradually became smaller towards the inside, where a few blades of grass were neatly interwoven. Its shape was narrow and deep, and altogether it had much the appearance of the nest of a reed wren, but it was much larger and less carefully constructed." The eggs differ considerably in size and colour: in my own collection I have the following varieties:—

1. Dull white, faintly tinged with green, blotched and spotted with light brown and dark greenish brown, some specimens with and others without a few bluish gray spots.
2. Resembling the above in colour, but with the marks very much smaller, and more uniformly distributed.
3. Clear bright greenish blue, with large spots of very dark brown and bluish gray.
4. Bluish green, with a few faint gray marks near the small end.

Eggs from the same nest seldom differ much in colour. Other particulars relating to this bird having already been described by Mr. Hancock, a mere repetition of them here would be superfluous.

Reed Wren (*S. arundinacea*). Summer visitor.

Nightingale (*S. Philomela*). Ditto.

Blackcap (*S. atricapilla*). Ditto.

Garden Warbler (*S. hortensis*). Summer. Early in August I saw a brood of unfledged young, in all probability a second brood. They were constantly supplied with flies and small caterpillars, of which the parent birds collected a large store, in a kind of pouch below the bill, before returning to the nest. The flies were taken upon the wing, the birds darting from the bush in which they were sitting, and never failing to secure one at every attempt. Towards the close of the breeding-season garden warblers, both old and young, were brought almost daily to the markets.

Whitethroat (*S. cinerea*). Arrives about the end of April, and pairs almost immediately afterwards. I found a nest nearly twice the usual size, composed entirely of hay, of which there happened to be a large quantity in the ditch beneath.

Lesser Whitethroat (*S. curruca*). Summer.

Wood Wren (*S. sylvicola*). Ditto.

Willow Wren (*S. trochilus*). Ditto.

Chiffchaff (*S. rufa*). Ditto.

Sylvia ——— ? A species previously unknown to me, appearing about the same time as the wood wren, to which it is somewhat similar in size and plumage, but not so brightly coloured, particularly upon the back and wings, which are rather of a brownish hue: the tail is slightly forked, and the yellow stripe reaches only from the bill to the eye, instead of extending above the latter. At first I imagined it to be a wood wren in immature plumage, although the bird-catchers endeavoured to persuade me that it was a distinct species, and even promised to bring me its eggs. When they did so shortly afterwards, I was still in doubt; for instead of the nest being like that of a wood wren, to which the bird must be very closely allied, it was shaped like a whitethroat's, and was even made of nearly similar materials, the only difference being that it was more substantially built, and had a little moss in the lining. The eggs were also about the size of those of a wood wren, and were spotted, though less plentifully, with dark brownish red; but the ground colour, instead of being white, was very decidedly pink. At length, after having received other nests, and examined several specimens of the bird itself, I became convinced that no deception had been practised, and that it was really a separate species. Probably it may already be a well-known bird, and if so perhaps some kind reader of the 'Zoologist' will set my doubt at rest for ever, that is, of course supposing the above description to be intelligible to any one besides myself.

HENRY L. SAXBY.

Balta Sound, Shetland,

April 24, 1861.

(To be continued).

Death of "Dr. Brooks," the Old Griffon Vulture, at the Zoological Gardens.—Last week, at the Zoological Gardens, died, apparently from sheer old age, a griffon vulture, which for upwards of thirty-three years had been an interesting ornament to the collection. This bird was presented to the Society in 1828 by Dr. Brooks, and is said to have been by no means young when it came into that gentleman's possession. "Dr. Brooks," as the vulture was popularly called, in spite of her being of the gentler sex, and having laid eggs at various times, might have been distinguished of late years from her companions by the lighter colour of her plumage and the faded appearance of her beak. The garb and staid demeanour of old age were gradually assumed, and, as time wore on, appetite began to fail (a bad sign when vultures are concerned), until at

last even the kind attentions of her keeper ceased to rouse her failing powers, and death released her from her long captivity. This vulture was the oldest inhabitant of the gardens, and the last survivor of the original zoological collection. Griffons are now well known to most persons, and many fine specimens have lived and died in the menagerie since this one first appeared on the scene, but "Dr. Brooks" has doubtless been useful in her generation, and deserves a passing notice now at the close of her career.—*E. W. H. Holdsworth, in the 'Field,' May 11, 1861.*

Occurrence of the Kite near Barnstaple.—I have to record the capture of a fine adult specimen of the kite, in a trap, at Kentisbury, a few miles from here, a few days since. The kite has been for many years unknown in this county. During his long experience of the Ornithology of Devonshire, Colonel Montagu never met with a specimen; the occurrence, therefore, of so rare a visitor in this neighbourhood is a matter of some interest.—*Murray A. Mathew; Raleigh, near Barnstaple, May 5, 1861.*

Eggs of the Dipper and Missel Thrush.—In your article upon Birds' Eggs (Zool. 7398), you put down the eggs of the dipper as 5; as far as my experience goes I have oftener found the eggs to be four than five, and in one instance found a nest containing only three young ones. I have also known the missel thrush in several instances to sit upon three eggs only.—*John P. Thomasson; Bolton, March 21, 1861.*

Nest of the Longtailed Titmouse.—In your "Observations on the Nests and Eggs of British Birds," mention is made of the longtailed titmouse. I merely beg to say that I have known of dozens of their nests, but never found one with two holes; many years ago, however, I took a nest late one evening, and three old birds were in the nest on the eggs, two females and one male; a similar case I never heard of. A friend of mine, Mr. Thomas Thompson, of Winlton, once took a nest with both the old birds on the eggs. Two years ago Mr. Thompson also took a nest in Gibside Wood, near this place, which had two distinct holes, and it is now in his possession. This is the only one I have ever seen. I believe Mr. Hewitson in his book speaks of having once seen one with two holes. No swallows have been seen in this neighbourhood this season. Redstarts, willow wrens, wood wrens, grasshopper warblers, chiffchaffs and tree pipits have arrived.—*Thomas Robson; Swallwell Iron Works, near Gateshead-on-Tyne, April 23, 1861.*

Variety of the Common Partridge.—In the thirty-fourth volume of the 'Naturalist's Library,' Sir W. Jardine states, under the common partridge, that he had procured a specimen from Mr. Fenton, in Edinburgh, which he thus describes. "Above of a brown tint, deeper than usual, but with the ordinary markings; the ground colour of the breast and under parts is of the uniform gray, which covers the breast in the ordinary state of the bird, having the black wavy markings, but there is not the slightest trace of broader marking to the feathers, or of the horse-shoe which prevails in other states, and to a certain extent, even in the female; the head, neck and patch on the throat are umber-brown, and around the bill, mouth and eyes is nearly pure black; the bill itself is of a darker colour than usual." No other writer seems to have noticed this singular variety, and I now draw attention to it, as similar birds have been killed in this county during the last three seasons. In December, 1860, two beautiful specimens were brought to me by one of the "unlicensed" sportsmen of the parish. He said that there were several more in the neighbourhood, and that he could easily distinguish them when on the wing from birds in the ordinary plumage. One had been shot a few weeks before, and fortunately preserved. In the previous season another "unlicensed" had come upon a covey feeding, and could not at first make them out, but he soon settled his

doubts by killing two of them, which were dispatched to a small market town in the district, from which Plymouth is supplied with game, &c. A gentleman at the latter place purchased in 1859 a specimen of this variety, and I look upon it as probable that it was one of the two birds referred to. In the previous year Captain Morshead, of Stoke, near Plymouth, obtained a specimen from the same poulterer. This bird I have seen, and it closely resembles in plumage my two birds. Here then we have proofs that all the birds of a certain covey similarly diverged in marking from the ordinary plumage of the common partridge, and that moulting did not destroy in the slightest degree this variation. One is almost tempted to dismiss the idea of "variety," and introduce that of "hybridity" as an explanation of the cause of this peculiar condition of plumage, but I am at a loss on whom to fix the parentage in connection with the common partridge. We have no redlegged partridges in this part of the county, otherwise a relationship might be detected in the black feathers around the bill and in the regions of the eye, combined with the absence of the horse-shoe marking on the lower breast. But even then there would be nothing in the form to lead to such a supposition, the variety being decidedly in shape a common partridge. I have premised that the specimens here recorded are identical with the Edinburgh bird, but I should remark that in addition to the black wavy markings on the gray ground of the breast there are light-coloured chestnut bands, one or more on each feather, occupying the whole space between the wavy markings, which would otherwise have been gray. My friend, Mr. J. Gatcombe, in describing in the 'Field' the specimens preserved at Plymouth, speaks of them as appearing to have been exposed to a red wash, a description which admirably applies to at least one of my specimens. A few of the flank feathers have the dark chestnut markings of the common bird. I should add that the man who detected the covey on the ground, and who killed two of them, said that the black around the bill was of a dark green when fresh. Are any of the correspondents of the 'Zoologist' conversant with this variety, which perhaps may not be uncommon in some localities? — *W. S. Hore ; Shebbear Vicarage, Devon, May 2, 1861.*

Hybrid between the Blackcock and Common Pheasant.—At the sale of the ornithological collection of the late Mr. Cornelius Tripe, of Devonport, I purchased a hybrid between the blackcock and pheasant, which had been obtained in the market of that town some ten or twelve years ago. It is a male in fine plumage, although in a slight state of moult about the neck. In 1839 I secured one of these hybrids, which had been killed in Cornwall, and which is recorded in Yarrell's 'British Birds.' The figure of Lord Howick's hybrid in the same work is a correct representation of this bird. In size, shape, feathering of the tarsi, form of the tail and general appearance my two birds agree, with the exception that the feathers of the neck in the recently purchased bird are of a straw-coloured white, with two short blackish lines, one on each side, running down from the darker feathers of the head. Some few of the feathers on the lower part of the breast have also the markings of the pheasant, though of a white colour. Yarrell mentions thirteen specimens of this hybrid, and I have no doubt that several more are to be found in the many collections (large and small) scattered throughout the country. Notices of them, I feel assured, would be acceptable to the pages of the 'Zoologist,' as they are of interest not only to the ornithologist but also to the sportsman, and it is in order to elicit communications of this description that I am induced to send the present remarks. Many years since I saw a female hybrid of this kind in a very good collection of birds made by the Rev. T. Johns, of Bradstone Rectory, near Tavistock; it was much smaller than my specimens.—*Id.*

Ostrich - Hunting in Northern Africa.—To enter upon a full history of "the pride of the Desert" would be out of place here, especially if the tales of the Arabs were incorporated in its annals. Unfortunately there is but little opportunity for testing from personal observation the truth of the characteristics attributed to the ostrich by the natives, who ascribe to it a strange mixture of sagacity and simplicity. The capture of the ostrich is the greatest feat of hunting to which the Arab sportsman aspires, and in richness of booty it ranks next to the plunder of a caravan. But such prizes are not to be obtained without cost and toil, and it is generally estimated that the capture of an ostrich or two must be at the sacrifice of the lives of two horses; so wary is the bird and so open are the vast plains over which it roams that no ambuscades or artifices can be employed, and the vulgar resource of dogged perseverance is the only mode of pursuit. The horses to be employed undergo a long and painful training, abstinence from water and a diet of dry dates being considered the best means for strengthening their wind. The hunters set forth with small skins of water strapped under their horses' bellies, and a scanty allowance of food for four or five days distributed judiciously about their saddles. The ostrich generally lives in companies of from four to six individuals, which do not appear to be in the habit, under ordinary circumstances, of wandering more than twenty or thirty miles from their head-quarters. When descried, two or three of the hunters follow the herd at a gentle gallop, endeavouring only to keep the birds in sight without alarming them or driving them at full speed, when they would soon be lost to view. The rest of the pursuers leisurely proceed in a direction at right angles to the course which the ostriches have taken, knowing by experience their habit of running in a circle. Posted on the best look-out they can find, they await for hours the anticipated route of the game, calculating upon intersecting their path. If fortunate enough to detect them, the relay sets upon the now exhausted flock, and frequently succeeds in running one or two down, though a horse or two generally falls exhausted in the pursuit. The ostrich when overtaken offers no resistance beyond kicking out sideways. A skin in full plumage is worth on the spot from forty to one hundred Spanish dollars, but the Arabs are in the habit of judiciously thinning the feathers, so that the trade can rarely obtain a specimen on which this tax has not been paid. I have frequently seen the ostrich domesticated without being in captivity. The Bey of Tuggurt kept several in a large court-yard, where they had free egress and ingress, but they showed no inclination to escape. They lived in very good fellowship with the numerous horses, asses and camels of the establishment, but had an admitted precedence, and would stretch their long necks over the shoulders of any of their companions, and select corn or dates from the nosebag. If any spirited colt or grumbling camel showed an inclination to resist, a side kick in the ribs very soon brought him to submission. To strange horses they exhibited a decided aversion, and would walk quietly alongside one, and then suddenly strike out with one leg at right angles to their bodies, a most clumsy-looking but a very effective mode of attack. I remember seeing another, apparently public property, in the market of Jamerna, who would go round and levy willing contributions from the vendors of dates and barley, and who slept at night (I suppose I must not say roosted) in the open square. But he presented a very beggarly appearance; for in return for the alms he received he had yielded to his caterers every feather in his body. Once, and once only, had I the good fortune to take an ostrich's nest, though fresh eggs were frequently brought in by the Arabs. There is something irresistible to the Nomad in the charm of an ostrich-chase, and, as often as our exhausted horses had suffered from the vain pursuit, it was

almost impossible to hold in our servants, when the alarm was given, from wildly galloping over the plain. On this occasion, however, we had observed with our telescopes two birds standing for some time in one spot, and were induced to ride towards them. By great good fortune we detected their track as we crossed it, for the stride of the ostrich often measuring when at full speed from twenty-two to twenty-eight feet, and there being simply the round impression of his two toes, it is very difficult to discover its course. We traced these steps back to the spot where we had seen the birds standing, and where the sand was well trodden down. Two Arabs at once dismounting began to dig with their hands, and presently brought up four fine fresh eggs from a depth of about a foot under the warm sand. I may remark that the egg of the North African ostrich seems to differ decidedly from that of the Cape bird; I have seen hundreds of specimens, and always found them rather larger than the southern eggs which we generally see in England, and quite smooth, with an ivory polished surface, and free from any punctures. Until I found the eggs myself, I was under the impression that they might be polished by the Arabs, but this is a mistake. The eggs are applied to various uses by the natives, chiefly as ornaments for their tents, drinking-cups and work-boxes, but above all for the embellishment of the mosques, where long rows are suspended from the arches or rafters, and of the burying-grounds, where each grave, especially at Waregla and Ngoussa, is decorated with an ostrich-egg set in mortar at the head and at the foot, the shieks being honoured with from twelve to twenty each, sometimes planted all round the grave, sometimes built into a pyramidal shape at the head. The ostrich appears to lay from the beginning of December to March,—at least fresh eggs are to be obtained throughout that period; but I was unable to ascertain either the time of incubation or the number of the brood, as no dependance can be placed on the Arab stories on these points. From all I could learn the number of eggs is not less than twelve, and the young are generally hatched about the end of February. The hunters all agree that though the parent bird covers the eggs with sand during the day she incubates them herself at night, and that her mate remains in attendance by her.—*H. B. Tristram in 'Ibis,'* ii. 72.

Does the Kittiwake Breed in the Isle of Wight. In a late number (*Zool.* 7500), is the following statement about the kittiwake: "At Fowl's Heugh they are said to breed in vast numbers, but never in the Isle of Wight, as Mr. Yarrell supposed." In his '*History of British Birds*' (iii. 445), Mr. Yarrell says, respecting the above bird, "This gull is decidedly a rock-breeder, and very common in the breeding season on all the rocky parts of the coast of Hampshire, Dorsetshire, Devonshire and part of Cornwall. I have seen hundreds in one day in the first week in June, between the Needle Rocks and Freshwater Gate in the Isle of Wight;" and in a note at p. 446 Mr. Yarrell says that kittiwakes breed every year on the cliffs of the Isle of Wight in great numbers. Those who think that the mere statement in the '*Zoologist*,' given without any evidence in support of it, supersedes the authority of such an ornithologist as the late Mr. Yarrell was, must believe one of two things, either that Mr. Yarrell did not know the kittiwake when he saw it, or that those birds frequented the Freshwater cliffs in hundreds, early in June, not for the purpose of breeding. I believe that few persons, who, like myself, have been in the habit of studying Yarrell for years, testing his accuracy by their own observations and experience, will think that his statements (especially where grounded on his own personal observations) are to be got rid of by any but the strongest and most unimpeachable evidence. One of his illustrations of the kittiwake, Mr. Yarrell says, was taken from an adult bird killed at the Isle of Wight early in June. It

is possible that the kittiwake may not now breed on the Freshwater cliffs, exposed as they are to constant persecution every breeding season, but I have no doubt that they did twenty years ago (my edition of the 'British Birds' was published in 1843), as Mr. Yarrell states. On referring to my notes of a visit paid to the Freshwater cliffs in May, 1850, I find recorded my belief that the gulls then frequenting the cliffs were the lesser blackbacked, the herring and the kittiwake. I had not the means for a close inspection. The kittiwake is, at least was, a very few years ago, one of the commonest of the gulls frequenting our southern coast, and from its much smaller size could hardly be mistaken for one of the other three very common species, the lesser blackbacked, the herring and the common gull, by any ornithological observer.—*Henry Hussey*; 7, *Hyde Park Square, May 3, 1861.*

[Of course I am perfectly aware of all that my late friend Mr. Yarrell wrote on this subject, but the question is simply one of fact. The Rev. C. A. Bury, Mr. A. G. More, Mr. Bond and Mr. Henry Rogers are the ornithologists *par excellence* of the Isle of Wight; I appeal to either or all of them, and shall be delighted to record their verdict in the 'Zoologist.' From their verdict there is certainly no appeal.—*Edward Newman.*]

The Crab and its Allies. By C. SPENCE BATE, Esq., F.L.S., &c.

(Continued from p. 6691).

IN catching and securing their young and food, most Crustacea make use of claws that are developed into a finger-and-thumb-like hand. These hands are generally formed by a process of the penultimate articulation produced to a considerable extent; this is impinged against at its apex by the extremity of the last joint or finger. But the form and character of these useful organs are extremely variable in shape, size and importance. In some they are simply legs, and do not exist in the form of chelæ, as in *Mysis* and many Isopods: in others they are the result of the finger, or last joint, falling back upon the preceding, which is more or less developed; such we find in the common shrimp, in most of the Amphipods, and the genus *Squilla* among the Stomapods. In some the finger is formed of the ultimate and the antagonizing thumb of the antepenultimate joint, as in *Leucothoë*, or even the joint preceding that, as in *Oara*; these



general forms again vary in detail of greater or less importance, and in the genus *Atoida* both finger and thumb terminate in a brush of a

very plumose character; a somewhat analogous example may be found on our own shores in the genus *Calissoma*, among the Amphipods, where the terminal nail or point is broken up into fine hairs.

The habits of those Crustacea which have feathered chelæ are not known, but the common soldier crab of our shores has the posterior pair of feet, though not developed into a plumose brush, yet so plentifully covered with hairs as to become an efficient brush; with this brush the animal cleans and mops out the branchial chamber and the many joints and crevices of his body; stopping now and again to wipe this brush in the Gnathopoda with the greatest care. This little brush is also formed as a claw, with which he pulls off any extraneous matter that the softer brush cannot remove. I never thought of it before, perhaps he scratches himself with it also. I wonder if a crab ever felt the sensation of tickling? Upon the softer portion of the body the soldier crab is very sensitive, and always keeps it enclosed within a shell of a mollusk, to preclude it from rough accidents. The way that I generally get them to come out of these shells, without rough-handling, is by pricking them through a hole in the apex of the shell in which they dwell. Then to see their look of surprise as they hurry out! but I must not forestall. The claws of the crab and lobster are not the same as those developed as such in the Amphipods and other Crustacea.

I should premise that a Crustacean is divided into three parts—the head (cephalon), the body (pereion), and the tail (pleon). To the pereion there are always seven pairs of limbs. In the higher forms the two first are developed as to belong to the mouth, and, therefore, in the crab and lobster we find the third pair in position become the hands, whereas in *Squilla* and in the Amphipods they are formed of those which are only appendages to the mouth in the crab; thus there appears a uniform law in Crustacea that the lower the type the more limbs are developed upon the simple form of the true leg,—a law that is consistent with the internal structure, since we find the nervous system more distinctly marked by separate ganglia.

I stated a short time back that, in order to relieve itself, a crab will run away and leave one of his limbs behind. This is a piece of economy in the habits of the animal common to most Articulata, as well as others even of a higher order; the legs of young frogs will, upon being removed, be again reproduced; but nowhere is the power so forcibly exemplified as in the Crustacea.

I kept some crabs for some time in order to experiment upon these

powers of loss and reproduction, and found that amputation in the limb thrown off invariably takes place at a particular joint, between the basos (second) and the ischium (third); the second in the crab, but in the lobster it is the third,—the coxa or first joint, which is fused with the body of the animal in the former, being free in the latter.

When any limb is injured the animal appears to suffer pain, holds its legs free from contact with anything, and runs from the neighbourhood of the catastrophe. In an instant it violently strikes the limb against some hard substance, and forthwith appears free from its great care; the limb instantly drops off, and to all appearance the crab has already forgotten that he ever had one, so contentedly he proceeds to enjoy himself.

The wound caused by the removal of the limb is rapidly skinned over, so rapidly as to appear to have been an act simultaneous with the amputation. It is not impossible that the development of this membrane may be the amputating force.

No animal will part with its limbs for slight causes, although the pain may be severe. I once cut the hand of a crab through the thumb and finger with a pair of scissors; it never threw off the limb, although it evidently suffered much; the poor thing would gently stroke the wounded arm with the other hand, and, as clearly as Sterne's ass, told its suffering. It smites upon the feelings, even through the enthusiasm of a naturalist who experiments from a love of truth, to see the weakest creature suffer, particularly if any animal has been kept for some time, and has a claim upon his kindness from its helplessness; and many is the time I have asked others to kill an animal, that I might not behold the stroke that made it cease to live, or put them to sleep with chloroform so that they might not know when they ceased to be among the living.

It is astonishing to see with what instinct the crabs appeared to escape the cutting of the scissors; I have often dodged about for some time trying to catch one of their claws between the blades, and often, when I seemed to have got one there, it would slip away before the blades came together. It was in one of these mutilating chases that occurred the case above alluded to, in which I missed the arm and caught the fingers only before the active fellow could get out of the way. The hand never grew again, and even after the animal had shed the *exuviae* it continued a maimed appendage.

Shortly after a limb is thrown off, in the centre of the wounded stump, within the enclosing membrane, the new organ commences its

development. A small papilla becomes visible and goes on increasing behind the membrane, causing it to protrude more and more as its own growth increases; but the membrane never breaks, for the new limb is part of a new animal within, and has little or no connexion with the old shell; within the membrane the limb lies bent up and passive until the period arrives that frees it from its position, when it appears as part of the new animal, and is in size greater or less, according to the length of the time that has elapsed since the loss of the old limb. In this condition, either large or small, it continues, as the rest of the animal, stationary in growth, until the next period of shedding the exuviæ, when it will be found to have advanced in size equal to its proportion relative to the animal.

Naturalists have generally assumed that this power on the part of these hard-skinned animals was given them in order that they might have, within their own means, the capability of overcoming the disastrous results of an injury; for, otherwise, a limb having been lacerated or torn off the animal, enclosed as it is within a most unyielding tissue, must of necessity bleed to death.

In all the natural sciences there is nothing more likely to lead to error than deductions based upon negative evidence. That an animal might bleed to death under such circumstances appeared a most probable hypothesis; but investigation among the lower forms proves that the Amphipods have not the power to throw off their limb on the receipt of an injury; and in the higher forms, also immediately after moulting, the limb is not rejected for half an hour or more while the external tissue is soft. If a leg in an Amphipod be broken off, the wound appears shortly after to cicatrize over with a black scar; but, so far as opportunity has enabled a judgment to be formed, the part is never thrown off. A limb upon being lost is capable of being reproduced, but the injured limb is not thrown off at the time that the injury is received, but probably at the period when the whole of the dermal tissue is exuviated; the new limb commences at that or some earlier period still, and continues its growth after the manner of the preceding.

The exhibition of indifference in these creatures to the loss of one or more limbs is an argument made use of by philosophers to prove that animals that have no true brain cannot suffer pain; that the writhings, like those of the worm upon the fisherman's hook, are the result of a reflex action only. I am not one of those who think that we ought not to inflict suffering upon the lower forms of life, if there be sufficient reason for doing so. To obtain knowledge of a single undiscovered

truth is of more value to man than the existence of myriads of small worms. But it is not on this account that I can blind my eyes to the demonstrative fact, that much of the contortions set up by these creatures can be accounted for upon no other hypothesis than that of suffering. It is true that a crab appears happy enough when its leg is off, but I have no doubt that it was suffering that instinctively made him get rid of it. We know that, in the human frame, upon the removal of an injured or diseased part the pain is considerably reduced, if not wholly removed, as is demonstrated by the extraction of an aching tooth: this is a forcible and not a voluntary act, as in the Crustacea.

There can be little doubt that the amount of pain which these creatures feel is very little, in fact, on a par with their consciousness in respect to their senses generally; but we can hardly believe that a limb is thrown off but from an instinctive feeling to relieve pain. It is true that they are stated to throw off their limbs at the report of cannon or the sound of thunder, and Mr. Gosse tells us that fishermen often experience that, upon catching hold of a lobster in his den, it retires further within the secure recesses, and leaves a claw in his hand. There can be little doubt that this last is the result of fear, an act instinctive of self-preservation. With regard to the former it can only be accounted for as the result of terror, but the cases, as stated by Mr. Bell, are such as to induce us to think that it may have been the result of other causes. In a passage in a thunder-storm across the North Sea, the tossing of the ship and rough usage must have a deteriorative influence upon confined and half-dead lobsters, sufficient to account for the phenomenon without attributing it to the influence of the thunder.

In the habits of these creatures there is another feature which, though it may be more or less common to other tribes, has here arrived at its culminating point. The removal of the external dermal tissue appears an universal law in creation; in some it may remain attached as a perennial epidermis that may thicken upon the surface as a protecting medium; in others it is brushed away in small but constant quantities; again it is removed as an entire covering, but in no class of animals do we find it so perfectly removed as in the Crustacea.

In reptiles the skin is torn off as a whole. The toad is said to do it by drawing it bit by bit into its mouth, and then spitting it out as a ball; from the frog it strips off as a thin membrane, almost invisible in its transparency, and floats away in the water; but in Crustacea it

becomes a more important transaction in its life,—it is a condition of growth, and is obliged to be repeated with constant regularity to admit of the enlargement of the animal. When the larva first breaks the egg-case, it is confined within a skin that encloses every part, each small cilia is bent, and every large one retracted within itself, like the draw-tubes of a telescope; this skin it shakes off within a few hours, or perhaps less. A few days and the process is again repeated, and probably, at intervals of about the same or a constantly increasing duration, is continued for some months. I say probably, because no effort has yet succeeded in keeping the larva through the earlier stages of its existence. The changes with each exuviation are very inconsiderable, but a certain amount takes place at every stage, and the animal loses the eccentric form of its youth and gradually acquires that of the parent crab. It is after it has arrived at the matured form that observers have been most successful in seeing the flaying process voluntarily carried on.

Réaumur was the first man who told us how it was done; he saw a river crayfish (*Astacus fluviatilis*), the *ecrevisse* of the French, struggle itself out of its skin. There is a charm about being the first to observe a fact; it is like starting in the race before one follows, and, starting first, keeps all others in the same line behind. Since Réaumur watched the crayfish, others have done the same as opportunity has occurred, and told us how the crab, the lobster, the shrimp, and the lower forms of Crustacea, free themselves from their coats. Couch, Gosse, Sir John Dalyell and Dr. James Salter have each written upon the subject, and I have watched them also. *Vide An. Nat. Hist.* 1849.

(To be continued.)

Notes on Spiders captured in 1860.

By the Rev. O. P.-CAMBRIDGE.

AN excess of moisture seems to be less prejudicial to spider-life than an excess of drought; and again, moisture is less hurtful to spiders than to insects in general; and so, while last season was so barren a one to entomologists, I have but little reason to be dissatisfied with the results of my researches in Arachnology, having captured and observed fifty-four species that I had not seen before, besides discovering both sexes of several others of which only one sex had hitherto been discovered.

I have also several species yet under examination, which I believe will prove to be new to Science: of the fifty-four species mentioned ten are new to Science and eleven new to Britain, but known and described by continental arachnologists.

Although, however, I had such good reason to be satisfied with my success, that success was, I think, chiefly owing to the study of British spiders being even yet in its infancy, for I scarcely ever gave up an hour for a search, either in woodland or on the heath, that I did not turn up either something new or some species the knowledge of which hitherto rested on a solitary specimen or so; and I think this will be the case for some time, more especially in those parts of the kingdom yet unsearched. Little or nothing is yet known of Scotch spiders, and while Mr. Blackwall's beautiful work on British and Irish spiders (now being published by the Ray Society) is yet unfinished, it would add much to the completeness of the work if more could be ascertained relative to the Scotch species.

I should be glad myself to enter into correspondence with any Scotch entomologist on the subject of Arachnology, and to exchange English Lepidoptera, or spiders, for spiders captured north of Berwick-upon-Tweed. I shall also be most glad to name, as far as my knowledge of species will permit, any specimens either of English, Scotch or Irish spiders sent me by post for examination.

Spiders may be safely sent by post, placed in corked glass tubes, with a little spirit in each tube, the tubes being packed with wadding in a moderately strong wooden entomological post-box, or else in a tin wax vesta box. In hot weather the tubes should not have much spirit in them, as the expansion of it is apt to drive out the cork, or else more frequently to burst out the bottom of the tube. A good way to send a single tube is to cut a large wine cork in two lengthwise, and in the two halves to hollow out just sufficient to receive the tube without pressing upon it; the two parts being then tied together, with the tube inside, may be sent in an envelope, with or without a little wadding to steady it, to any part of the world, without damage: one tube will hold a number of specimens of small species, but a larger piece of cork, with two, three or more separate hollowings-out, might easily be made to transmit a large number of specimens, and this would be much lighter than a tin box and less liable to fracture than a wooden one.

I have now and at other times called special attention to the success I have hitherto met with, in hopes of inciting others to enter the field of Arachnology; but the question invariably asked me by those who

write on the strength of promises of assistance is, "What work is there from which we may obtain the names of our captures, &c.?" I can now point to the work by Mr. Blackwall mentioned above as worthy of all commendation, both for the beauty of the plates (especially the minute accuracy of the palpi) and the accuracy of the descriptions; so that one great hindrance to the study is now in course of removal.

The early part of last season (April and May, 1860) promised to be unusually prolific in spiders; but the heavy rains and cold ungenial weather that set in early in June thinned the summer broods, and some species usually very abundant were quite scarce. The autumn was very barren in adults, and whole broods of young must have been destroyed by the continued rain and wind at the end of October, and as the progenitors of the next season's broods spring from those that hibernate and become adult early in the spring and summer, I think we may expect the next season to be a very barren one, whatever the weather may be, though if the early summer be fine and genial the autumn broods will probably regain their usual numbers.

The following list of my last year's captures may be considered as a further supplement to the lists in the 'Zoologist' (Zool. 6493, 6862). I have, though, noticed here afresh some few species already noticed in those lists; but where this is the case I have inserted a reference to the former notice.

The terms "common," "rare," &c., are used in the present list, as nearly as practicable, in the sense explained (Zool. 6893). All the species mentioned in the present list were captured by myself, except where stated otherwise.

Order ARANEIDEA.

Tribe OCTONOCULINA.—Family MYGALIDÆ.

Atypus Sulzeri, *Latreille* (see Zool. 6494). An immature female, taken from the bottom of its silken tube, dug out of the ground, in the Isle of Portland, in July, 1860.

Family LYCOSIDÆ.

Lycosa armillata, *Walck.* New to Britain. An adult male of this species taken running in the sunshine on Hursley Down, near Winchester, in May, 1860. It is allied to *L. rapax*, but easily distinguished by the gouty tibial joints of the first pair of legs, and it is much more clearly and distinctly marked, the contrast between the jet-black and pure white hairs on the cephalothorax and abdomen being very remarkable.

L. herbigrada, *Blackw.* (see Zool. 6495). Females of this very distinctly marked species had been taken before, but no males; in May and June, 1860, however, I found both sexes, adult, very common, but local, on heaths at Lyndhurst, Hants, and Bloxworth, Dorset. This species seems peculiar to heaths in the South of England, and rather local there; the ashy gray ground colour of it admirably adapts it to the spots where it delights to bask in the bright sunshine. It is a very active species, and captures its prey, small beetles especially, by fairly coursing them down. This is also the case with *L. picta* and *L. andrenivora*, which last in turn courses down *L. herbigrada*: I have seen several very exciting and amusing chases of the kind; *L. herbigrada* though generally manages, I suspect, to get away, owing to its great speed, unless caught at a meuse or surprised unawares, and if so, *L. andrenivora* being so far superior in size, the issue of the fight is not long doubtful. As far as my observations go, I do not think any *Lycosa* jumps on its prey, like the *Salticidæ*, but always seizes it in fair plain running, whether the prey is either running or stationary.

L. latitans, *Blackw.* Frequent in sloppy marshes near Bloxworth, Dorset. I have also found a few solitary specimens among damp moss on the lawn at Bloxworth Rectory, far removed from marshy ground. This well bears out Mr. Blackwall's observation ('History of British Spiders,' p. 34), "that it connects the purely terrestrial with the semi-aquatic *Lycosæ*;" it is adult in June.

L. piscatoria, *Koch.* Frequent in sloppy marshes, in company with *L. latitans*, and adult at the same time.

Dolomedes ornatus *Blackw.* (see Zool. 6495). Frequent, in May, 1860, on rushes and grass in bogs on Lyndhurst Heath, but none adult. I have a suspicion (shared in by Mr. Meade), that this will eventually prove to be only the immature state of *D. fimbriatus*.

Hecæerge spinimana, *Sundeval.* Not rare, Hursley and Bloxworth, among weeds and rubbish in hedges, and at the roots of heath; throughout the year.

Family SALTICIDÆ.

Salticus sparsus, *Blackw.* (Zool. 6495). Adults of both sexes, not rare, on walls of Red House, Hursley, end of May, 1860.

S. quinquepartitus, *Walck.* New as British. An adult male taken on Bloxworth Heath by myself, in July, 1860; and one received shortly after from Bournemouth, Hants, taken by O. H. Crewe, Esq.

S. grossipes, *Degeer*. New as British. An adult male on rushes in a bog near Lyndhurst, Hants, in May, 1860.

S. nidicolens, *Walck*. New as British. An immature female of this distinctly marked species on Bloxworth Heath, in September, 1860.

S. obscurus, *Blackw*. Adults of both sexes frequent on trees and bushes in woods at Lyndhurst and Bloxworth, throughout the summer of 1860; a single specimen of the male only hitherto known.

S. tardigradus, *Walck*. An adult female received for examination from Mr. W. C. Unwin, of Lewes, Sussex, in January, 1860, and an immature female taken by myself in a cleft of a wood paling at Calke Abbey, near Derby, in April, 1860.

S. distinctus, *Blackw*. Immature males and females taken under loose stones in garden wall at Hendre House, Llanrwst, in April.

Family THOMISIDÆ.

Thomisus clavatus, *Latreille* (Zool. 6863). Frequent, under detached pieces of rock in the Isle of Portland, July, 1860. Principally adult females with their egg-cocoons, each of which contained from five to seven eggs not agglutinated together. Like many other spiders the attachment of this species to its cocoon is very remarkable, though not perhaps so strong as with many of the Lycosidæ.

T. lanio, *Koch*. New as British. Males and females, adult, occasional, on oak underwood, near Lyndhurst, end of May, 1860.

T. pallidus, *Blackw*. An adult female on Lyndhurst Heath, under dry cowdung, in 1858. Hitherto mistaken, both by Mr. Meade and myself, for *T. atomarius*, the notice concerning which must therefore be struck out from Zool. 6493. An adult male, and several immature females, at Bloxworth in October, 1860. The adult male had been hitherto undiscovered.

T. floricolens, *Walck*. An adult male and several immature females, on Scotch firs, Lyndhurst, May, 1860; also immature females, occasional, on underwood, Bloxworth, July, 1860.

Philodromus dispar, *Walck*. (Zool. 6496). Males and females, adult and immature, at Hursley, Lyndhurst and Bloxworth, throughout the summer. It appears to arrive at the adult state in June and July, and is frequent on trees and bushes.

Sparassus smaragdulus, *Walck*. (Zool. 6497). I have never yet succeeded in capturing an adult male of this beautiful species, but males and females immature are occasional, on underwood, Bloxworth, in autumn.

Family DRASSIDÆ.

Drassus sericeus, *Sundeval* (Zool. 6497). Rare, Hursley, in May, 1860, and Bloxworth, throughout the year.

D. lucifugus, *Walck.* (Zool. 6497). Males adult, and females immature, under stones and dry cowdung, Bloxworth Heath, July and August, 1860; rare.

D. pedestris, *Koch.* New as British. Not rare; males and females, adult and immature, under stones and rocks, Portland, July, 1860. This species is allied to *D. ater*, but the shortness of the hairs covering its abdomen, the tarsal, metatarsal and tibial joints of the legs, which in immature specimens are constantly pale whitish, and in mature specimens brownish red, besides the very different form and structure of the palpi and the colour of the plates of the spiracles, readily distinguish it from *D. ater*. It is an exceedingly nimble species.

D. pusillus, *Koch.* Male and female adult, among rubbish in hedge on Hursley Down, May, 1860.

D. prælongipes, *Cambridge.* New to Science. Rare; three adult males and an adult female, running on edge of bare spots on the heath, and at heath roots, Bloxworth, July, 1860; also an immature female, received about the same time, from Mr. C. H. Brown, Southport, Lancashire.

D. subniger, *Cambridge.* New to Science. An adult male, among rubbish in hedge on Hursley Down, May, 1860.

D. lapidicolens, *Walck., Koch* (Zool. 6863). A male adult at Hursley, May, 1860; also males and females, adult and immature, common under stones, &c., Portland, June, 1860.

D. fulgens, *Walck.* New as British. A male adult and two immature females of this brilliant spider, under stones, Portland, July, 1860.

D. propinquus *Blackw.* (Zool. 6497). Rare, among dead rubbish in hedges, Hursley, May 1860, and at heath roots, Bloxworth; adults of both sexes common under stones, Portland, June, 1860.

Clubiona corticalis, *Walck.* (Zool. 6497). Immature specimens of both sexes frequent under bark on old decaying trees at Calke Abbey, near Derby, in April, 1860. An adult male received from the same locality in July, from the Rev. T. W. Huthwaite.

C. brevipes, *Blackw.* Rare, adult males on underwood, Lyndhurst and Bloxworth, May and June, 1860.

C. comta, *Koch* (Zool. 6497.) Frequent, on trees and bushes, Hursley,

Lyndhurst and Bloxworth, throughout the summer. It is adult at the end of May.

C. accentuata, *Walck.* (Zool. 6497). Frequent in same situations and at the same time as *C. comta*. Adult in May and June.

C. domestica, *Wider.* (Zool. 6498). Occasional, under stones and pieces of rock, Portland, throughout the summer; females adult in July. I have never yet succeeded in obtaining a male.

Ciniflo ferox, *Koch* (Zool. 6864). Males adult, rare in outhouses, Tecknall, near Derby, in April, 1860; also one received from Mr. Wintle, of Gloucester, and several from Mr. Unwin, captured at Lewes, Sussex.

C. mordax, *Blackw.* (Zool. 6498). Several received from Mr. H. Rogers, of Freshwater, Isle of Wight. I feel certain that this is only a dark variety of *C. ferox*.

C. humilis, *Blackw.* Very common on furze bushes. Males and females adult, at Hursley, Lyndhurst and Bloxworth, in May and June, 1860.

Veleda lineata, *Blackw.* (Zool. 6498). Male and female, not quite adult, on heath, Lyndhurst, end of May, 1860.

Agelena elegans, *Blackw.* Several in a swamp near Hendre House, Llanrwst, April, 1860.

A. montana, *Blackw.* Occasional, under stones, Portland, October, 1860.

A. brunnea, *Blackw.* (Zool. 6498). Occasional at heath roots, Bloxworth, throughout the summer. Adult in September.

A. subfusca, *Cambridge.* New to Science. An adult male at Lyndhurst, May, 1860.

Tegenaria campestris, *Koch.* New as British. Two females, among rubbish in hedge, Hursley Down, May, 1860; several females adult, and males immature, among a heap of brickbats, in the interstices of which they had formed webs very similar to those of *T. civilis*, at Bloxworth Rectory, in June; and a male adult at heath roots, Bloxworth Heath, in October of the same year.

Cælotes saxatilis, *Blackw.* Not rare, under stones, near Calke Abbey, Derby; and at Hendre, near Llanrwst, April, 1860. The range of this spider does not appear, as yet, to extend further south than Derbyshire. I have met with it frequently at Brancepeth, near Durham, and also near Bradford, Yorkshire. It is adult in April and May.

Theridion stictum, *Cambridge.* New to Science. Two immature females under heathy ledge, Bloxworth, September, 1860.

T. sisypum, *Walck.* (Zool. 6499). Very rare, Hursley, May, 1860. An adult female and her egg-cocoon in a web spun among wild honey-suckle by the side of the trunk of an oak, Bloxworth, July, 1860.

T. simile, *Walck.* New as British. Common on furze bushes, Hursley, May, 1860; also in woods, Bloxworth, in June.

T. carolinum, *Walck.* (Zool. 6864). Occasional, Hursley, Lyndhurst and Bloxworth, among rubbish in hedges and at heath roots, throughout the summer. The head quarters of this species, as far as I have yet observed it, seem to be at Southport, Lancashire, among dwarf willows, &c., on the sand hills.

T. guttatum, *Walck.* New as British. Two adult females and an immature male, among rubbish in a hedge, Hursley, in May, 1860. Males and females, adult and immature, at heath roots, Bloxworth, not rare.

T. pallens, *Blackw.* (Zool. 6864). Common on trees and bushes, Hursley, Lyndhurst and Bloxworth; adult males may occasionally be found on posts and palings in May. The species mentioned at Zool. 6499 as *T. albens* was mistaken by Mr. Meade and myself for that species, but is only *T. pallens*.

T. angulatum, *Blackw.* An adult male and two adult females, among rubbish in hedge, Hursley, May, 1860; an adult male on a thorn bush, Lyndhurst, in May; females and males immature among heath, Bloxworth, rare, October, 1860.

Theridion variegatum, *Walck.* (Zool. 6864). Occasional on furze bushes, among weeds and rubbish in hedges, and at heath roots, Bloxworth, 1860. I have never met with but one adult male.

T. signatum, *Walck.* (Zool. 6864). An immature male under a stone near Calke Abbey, Derbyshire, April, 1860.

T. filipes, *Blackw.* (Zool. 6499). Rare, Bloxworth, 1860; and Southport, 1859.

T. inornatum, *Cambridge.* New to Science. Males and females, adult and immature, under stones, Portland, October, 1859, and June and July, 1860, occasional; and also at heath roots, Bloxworth.

Family LINYPHIIDÆ.

Linyphia albula, *Cambridge.* New to Science. An adult female on a holly bush, Hursley, May, 1860.

L. cripticolens, *Walck.* An adult male in outhouse, Bloxworth Rectory, July, 1860.

L. frenata, *Wider.* Two adult females, among rubbish on heathy bank, Bloxworth, October, 1860.

L. Claytoniæ, *Blackw.* This species, which is synonymic with *L. anthracina*, is common on trees, bushes and heath, Bloxworth, in May, and again in August, September and October.

L. obscura, *Blackw.* An adult male received for examination in November, 1860, from Mr. Wintle, of Gloucester.

Neriène munda, *Blackw.* Males and females, adult, Bloxworth, in summer of 1860. Also an adult male received from Lewes, from Mr. W. C. Unwin.

N. cornuta, *Blackw.* (Zool. 6500). Males and females, adult, not rare, on trees, and occasionally running on posts and palings, Bloxworth, in summer of 1860; also at Lyndhurst in May.

N. nigra, *Blackw.* An adult male and female under a stone at Calke Abbey, April.

N. graminicola, *Sundeval.* Males and females, adult, occasional, on underwood, Bloxworth, in summer of 1860.

N. variegata, *Blackw.* (Zool. 6500). Adults of both sexes common on furze bushes and among heath, Hursley, Bloxworth and Lyndhurst, in May, 1860.

N. Huthwaitii, *Cambridge.* New to Science. An adult male of this very distinct species sent me by the Rev. T. W. Huthwaite, who captured it at Calke Abbey, in July, 1860.

Walckenäera acuminata, *Blackw.* Adult females under stones in woods at Calke Abbey, and at Conway, in April, 1860; also one sent me for examination in January, 1860, by Mr. Unwin, captured at Lewes.

W. cuspidata, *Blackw.* Males and females adult, rare, in an out-house, Ticknall, near Derby, April, 1860. The species mentioned at Zool. 6500 as *W. cuspidata* is *W. monoceros* (Zool. 6865).

W. unicornis, *Cambridge.* New to Science. Five males, adult, on bushes, Lyndhurst, May, 1860.

W. parallela, *Wider* (Zool. 6865). An adult male sent me from Brighton by F. Bond, Esq., April, 1860; one at Hursley, taken by myself, in May, and another on a wall at Wareham, Dorset, in July.

W. punctata, *Blackw.* Adult females, rare, on underwood, Lyndhurst, in May, and Bloxworth, in July.

W. flavipes, *Blackw.* Common on bushes in woods, Bloxworth; both sexes adult, in July.

W. hiemalis, *Blackw.* Males and females, adult, occasional, on trees and bushes, Lyndhurst, May.

W. bifrons, *Blackw.* Males and females, adult and immature,

occasional, on juniper bushes, Hursley, in May ; also an adult male at Bloxworth, in July.

W. depressa, *Blackw.* An adult male and several females, on underwood, Bloxworth, in the summer.

W. humilis, *Blackw.* Several adult males and an adult female, on furze bushes, Hursley, May.

W. pumila, *Blackw.* An adult male, on underwood, Bloxworth, July.

W. ludicra, *Cambridge.* New to Science. Common, both sexes adult, on furze bushes and among heath, at Hursley, Lyndhurst and Bloxworth, in April and May.

W. saxicola, *Cambridge.* New to Science. Two adult males and an adult female, under stones, Portland, July.

W. pratensis, *Blackw.* Males and females, adult, under banks of the Conway, at Hendre, North Wales, in April. Mr. Blackwall had before discovered the female, but the male was new to Science, and the species is yet undescribed.

Pachygnatha Clerckii, *Sundeval* (Zool. 6865). Males and females, adult, sent me from Calke Abbey by the Rev. T. W. Huthwaite, April.

Epëira solers, *Walck.* (Zool. 6500). Males and females, adult, frequent, on heath, Bloxworth and Lyndhurst, May and June ; in October it is very common, but none adult.

E. acalypha, *Walck.* (Zool. 6500). Males and females, adult, common, on heath, Lyndhurst and Bloxworth, May and June. Adult males are less common than females.

E. adianta, *Walck.* (Zool. 6501). Frequent on heath and low furze bushes, Bloxworth, August. This species is adult in September and October ; adult males are rare.

E. celata, *Blackw.* An immature female received from the Rev. T. W. Huthwaite, captured at Calke in October.

E. albimacula, *Blackw.* Frequent, both sexes, adult, on juniper bushes and hedges, Hursley Down, and on underwood, Bloxworth, May, June and July.

E. anthracina, *Koch.* New as British. Two adult males, on underwood, Lyndhurst, May.

E. conica, *Walck.* (Zool. 6501). Adult males very rare, Hursley, May.

E. tubulosa, *Walck.* (Zool. 6501). Male and females, adult, Lyndhurst Heath, end of May, rare.

E. calva, *Blackw.* (Zool. 6501). Male and females, adult, Lynd-

hurst Heath, end of May. An immature female, Bloxworth Heath, August.

E. Herii, Koch. (Zool. 6501). Males not quite adult, females adult, end of May, Lyndhurst Heath.

E. angulata, Koch. (Zool. 6501). Males and females, adult, Hursley and Lyndhurst, on furze bushes and underwood, end of May.

E. bella, Meade. New to Science. An immature male and several adult and immature females kindly sent me for my inspection, by R. H. Meade, Esq., who captured them in Buckinghamshire in the summer.

Tribe SENOCULINA.—Family DYSDERIDÆ.

Dysdera erythrina, Walck. (Zool. 6501). Very rare, under stones, Bloxworth Heath. This species seems to be almost exclusively a coast one, as it is very common under stones at Portland.

Segestria senoculata, Walck. (Zool. 6501). Frequent at Calke Abbey, under bark of decaying trees and under stones. Occasional at Portland, under stones; adult in May and June.

Oonops pulcher, Templeton (Zool. 6502). Occasional, under stones, Portland. One male adult, in October.

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Errata in previous Lists.—P. 6865, line 1, for *Linyphia Fenella* read *Linyphia tenella*. Same page, line 23, for *Walckenäera fastigiata* read *Walckenäera fastigata*. Same page, line 6 from bottom, for *Hatta Wall* read *haw-haw Wall*. P. 6893, line 17, for *confused* read *confined*. P. 6895, line 1, for the comma after "Natural History" place a full stop, and instead of the full stop after "classification" in line 2, place a comma. P. 6896, line 4, for *cespiticola* read *cespiticolis*. P. 6898, line 17, for *Zool. 6700* read *Zool. 6493*.—O. P.-C.

The Economy of Limenitis Sibylla.—In July the pregnant female is seen hovering over the thickest parts of our taller copses, wherever the stems of the honeysuckle are imbedded, like petrified snakes, in the upright stems of the hazels, and the foliage of that sweet climber has surmounted the hazel spray, and its blossoms are gaping wide in the sunshine, and diffusing their delicate fragrance on the summer air. The actions and movements of a female butterfly when engaged in the maternal duty of oviposition is very different from her ordinary gait when sailing over the opening blossoms of the bramble in company with friends, lovers and kinsfolk. It is evident to the eye of the naturalist that she is now on weighty affairs of business; there is no time lost, none of those flirtations and love-chases so much admired and so glowingly described by our predecessors in the study of Entomology. Her flight is slow, flagging, flapping, and only from leaf to leaf. She selects with unerring discrimination the leaves of the honeysuckle, even when surrounded, and apparently half smothered with the foliage

of the hazel, and lays a single egg on the upper surface of a leaf; she then flutters off to another, then to another, never tiring, never hesitating which leaf to choose, but always directed by an unfailing instinct to the honeysuckle, and always avoiding those leaves on which an egg has already been deposited. The egg is something the shape of an orange, only flatter at the poles, and has been compared to those sea-urchins or sea-hedgehogs which are found on the sea-beach, and are to be seen in the window of every shell shop. In fourteen days the little larva comes out of the egg-shell, and toddles to the very tip of the leaf before it begins eating, and then it nibbles away day after day, eating the green part, and leaving only the midrib sticking out like a bristle, and always after a good meal of leaf it goes to the very point of this bristle, and there rests while its meal digests and while it acquires strength for future attacks on the same leaf. Day after day the alternate processes of eating the leaf and resting on the tip of the bristle-like midrib continue, until three quarters or rather more of the leaf has been eaten, and then it knows that its devouring duties for the year are over. We all know that the leaves of the honeysuckle are deciduous, and, in the course of Nature, would fall off before winter; this, however, would not suit the requirements of the juvenile larva, which, having once fallen to the ground with the fallen leaf, would inevitably perish. To prevent this falling is absolutely necessary to the existence of the larva, and therefore to the preservation of the species; how then is this to be accomplished? The larva, by spinning a number of silken threads wound round and round the twig, and round and round the leaf-stalk, fastens the leaf-stalk to the twig to which it is still attached. The next process is to make a winter habitation of that portion of leaf that still remains uneaten; the corners of this uneaten portion are fastened tightly together, and then the edges are united, these operations being effected by means of silk spun from the mouth; the work is then finished, and the little caterpillar is thus laid up for winter quarters inside his hammock, the bristle-like midrib of the leaf curling over it like a tail. Now the process of fastening the leaf to the twig by silken cables has done nothing to prevent the natural dehiscence of the leaf-stalk at its base, so that this inevitable process takes place at the appointed time, and then the little cot, instead of standing erect, falls as far as the cables will permit, always less than half an inch, and rocks to and fro all the winter, lulling the infant larva to sleep, and keeping him asleep for six consecutive months; rain, snow, ice, wind, and all the vicissitudes of our winter, have no power to injure or even wake him; hung aloft in his little cradle he rocks in comfort and security, and rides out the roughest storm without a thought of harm. In April he wakes up, the same increase of temperature which poets tell us rouses "the torpid sap detrudded to the roots,"—a very apocryphal doctrine by the way, as the change of temperature is more likely to be felt in the air than in the earth: however, the same change of temperature which compels the leaf-buds to burst, also resuscitates the little caterpillar; he wakes up, crawls out of his hammock, and commences operations on the expanding leaves. He now no longer confines himself to the tip of the leaf, but feeds away, with all the voracity which a winter's fast may be supposed to have engendered, during nearly the whole of April and May; and by the 1st of June is full fed, and then differs *in toto* from the imaginary larva of *Limenitis Sibylla* figured by Curtis, and described by our English authorities: he is of a pale green colour, with red-brown head, legs and spines, and a pure white streak on each side just above the claspers; this streak begins on the 6th segment and extends to the last pair of claspers; the head itself is beset with short sharp spines; there are two long and branched spines on the 2nd, 3rd, 5th,

11th and 12th segments, and two shorter ones on the 6th, 7th, 8th, 9th and 10th. About the 10th of June he suspends himself by the tail from the stem of the honey-suckle, and changes to a grotesquely-shaped chrysalis, which hangs head downwards, and seems to have two ears: the wing-cases and front of the head are dark green, the body yellow, and hind part of the thorax brown and curiously humped: viewed sideways this chrysalis rather resembles a very ugly mask, the humps representing a very prominent nose and chin. The butterfly is on the wing during July, and flies with such exceeding grace and elegance as to have attracted the notice of all lovers of Nature. We are told of an aged enthusiast in Entomology who, after gout or rheumatism had deprived him of the pleasure of pursuit on foot, used to take a post-chaise to Coombe Wood, in Surrey, to watch the flight of this elegant butterfly. A considerable portion of this life-history of *Limenitis Sibylla* has already been published in my Natural History of British Butterflies, but the wonderful history of its hibernation was discovered by Dr. Maclean, of Colchester, and kindly communicated to me by that prince of entomological observers, who also favoured Dr. Bree with the particulars, with permission to use them in his work intituled 'Species not Transmutable.'—*Edward Newman.*

Occurrence of Zygæna Achilleæ in Ireland.—It is a dangerous thing to write about our British *Zygæna*: if any one incline to take up the genus I heartily wish him well through it. It is an equally dangerous thing to introduce a new species on the faith of a single specimen; but I will risk both these dangers. About a month since Mr. Birchall sent me a single specimen of a *Zygæna* taken by himself in the West of Ireland. I could not make it out, as it presented a combination of characters which do not exist in any other species. After a while I submitted it to Mr. Doubleday, who pronounced no opinion, but, with his invariable promptitude and kindness, sent me a pair of continental specimens of *Zygæna Achilleæ*, for the purpose of comparison; and the new comer proved to be identical with that continental species. It may at once be distinguished from every species yet discovered in this kingdom, save and except *Z. Minos*, by the extreme bluntness and capitate form of the antennæ; and from *Z. Minos* it is instantly distinguishable by the texture and colour of the covering of the body: in *Z. Minos* this covering is long, shaggy and dead black; in *Z. Achilleæ* it is close, compact, shining, and chalybeous-blue. On the Continent this species occurs more particularly on chalky soils, but I am not aware of the existence of chalk in the vicinity of its Irish habitat. I forbear describing the colour of the wings, as the species seems subject to much variation in this respect.—*Id.*

Description of the Larva of Mæsia belgaria.—Rolls itself in a ring, and falls off its food when handled or annoyed, and will remain in this position for an hour without moving. Form uniformly cylindrical, with two small warts placed transversely on the back of each segment; a conspicuous conical horn on the 12th segment; and a pair of slender, pointed, closely approximate horns, pointing backwards, on the 13th. Colour brown, variegated, mottled and streaked with gray; on the anterior pair of claspers is a white stripe, and a faint appearance of a similar stripe on the posterior pair. The colour of this larva is very plain and obscure; the Sphinx-like dorsal horn and the two anal horns are very distinctive. Feeds on *Calluna vulgaris* (common ling), on which the egg is laid in June; it hibernates very early in the autumn, and, beginning to feed in April, grows rapidly, and is full fed about the 1st of May, when it spins a slight cocoon on the ground, and there changes to a pupa, and to a perfect

insect about the end of May. The first of the moths emerged, in confinement, on the 20th of May. I am indebted to Mr. Thomas Hockett for the loan of this larva.—
Edward Newman.

Notes on new or little known British Eupitheciæ. By HENRY DOUBLEDAY, Esq. *The Descriptions of the Larvæ by the Rev. H. HARPUR CREWE, M.A.*

A FEW weeks since I forwarded specimens of most of our Eupitheciæ to Dr. Herrich-Schæffer, and he has kindly sent me some observations upon them which will probably be interesting to the readers of the 'Zoologist.'

Eupithecia affinitata. "New species, which has not been found in Germany."

E. expallidata. "Also new to me, and unknown in Germany."

E. absynthiata. "Your specimens differ a little from ours. Feeds upon *Senecio Jacobeæ*, *Artemisia vulgaris* and *Solidago virgaureæ*."

E. abbreviata. "Rare with us, and sometimes confounded with *E. dodoneata*. A good species."

E. subfulvata. "Appears to me different from our varieties of *E. succenturiata*, of which I will send you specimens."

E. denotata, *Guenée*. "This is the true *E. pimpinellata* of Hübner without doubt." (I have always thought that this species was the true *E. pimpinellata* of Hübner, and my friend M. Guenée is now of the same opinion, but it seems probable that *E. denotata* is only a variety of the same species, and therefore this name must sink altogether.—*H. D.*)

E. pimpinellata, *Guen.* "Not found in Germany, and new to me. The name must be changed." (I have proposed to call this species *E. virgaureata*, and M. Guenée considers the name very appropriate, and will adopt it for this species in the appendix to his work.—*H. D.*)

E. pimpinellata, *var. A.*, *Guen.* "This is my *E. tripunctata*. The name *albipunctata* has been employed by Hufnagle. (It is impossible to say whether Haworth described this species or *E. satyrata* under the name of *albipunctata*, and therefore Dr. Herrich-Schæffer's name must be adopted. The Rev. H. Harpur Crewe, who has done more than any other entomologist to elucidate the history of this interesting genus, first clearly proved that the last two species are truly distinct.—*H. D.*)

E. constrictata, *Guen.* "This is my *E. distinctaria*." (Dr. Herrich-Schæffer's name being the older of the two must be adopted.—*H. D.*)

No. 22, ———? (The species which I sent under this number was taken on the cliffs near Dover, by Mr. Grant and Mr. S. Stevens, some years since. Guenée thought it might be a variety of *E. sobrinata*, but Dr. Herrich-Schæffer thinks it will prove a distinct species: till more is known of its history nothing can be affirmed with any certainty about it.—*H. D.*)

No. 27, ———? "This is my *E. trisignaria*. The larvæ are found with us upon *Heracleum spondylium*, in July and August." (The Rev. Joseph Greene discovered the larva of this species upon an allied plant, *Angelica sylvestris*, in a damp wood. The perfect insect is very dull-coloured, but quite distinct from any other species. It is new to this country.—*H. D.*)

E. Haworthiata. "This is a good species, and the *E. isogrammata* of Treitschke, and is rare with us." (Of course my name must sink.—*H. D.*)

E. pulchellata. "A good species, not found in Germany."

Of the other species sent there is nothing to remark.

I sent a few Tortrices with the *Eupitheciæ*; among them two species of *Catoptria*. One of these, which has been called *C. modestana* in this country, is *C. æmulana*, *Schlg.*; the other *C. conterminana*, *H.-S.*

HENRY DOUBLEDAY.

Epping, May 6, 1861.

Description of the Larva of Eupithecia tripunctata, *H.-S.*—

Var. 1.—Ground colour pale lemon-yellow, more or less suffused with rich brown. Down the centre of the back a series of deep brown lily-shaped spots, bordered on either side by a slender subdorsal line of the same colour. On each side a row of slanting bright yellow stripes and deep brown blotches. Belly greenish yellow. Central ventral line deep brown. Subventral line deep brown, much broader than the central one. Body studded with numerous small white tubercles.

Var. 2.—Ground colour pale yellowish green. Down the centre of back a series of semi lozenge-shaped dusky brown spots, connected by a central line of the same colour, and becoming indistinct on the posterior and confluent on the anterior segments. Subdorsal lines dusky, indistinct. On each side a series of dusky blotches. Central ventral line dusky, interrupted. Whole body, especially back, studded with minute white tubercles and a few short blackish hairs. The dorsal,

subdorsal and lateral blotches, spots and lines, are sometimes almost or entirely wanting, leaving the larva a uniform pale yellowish green.

This larva very strongly resembles that of *E. satyrata* in form and appearance, but is less robust. It tapers towards the head, and has a slightly wrinkled appearance. When full fed and ready to spin up it turns pink. Pupa enclosed in a slight earthen cocoon. Thorax yellowish green, wing-cases dark green, furrowed and wrinkled. Abdomen tapering, rough, dull red. A slight ventral protuberance.

I have for the last four or five years been in the habit of taking this larva and breeding the perfect insect, which from the first I recognised to be quite distinct from all our previously known British species.

After much delay I have at last, through the kindness of Mr. Doubleday and M. Herrich-Schæffer, succeeded in getting it named. The larva appears to be totally unknown on the Continent. It feeds in September, in damp woods, on the flowers and seeds of *Angelica sylvestris*, and occasionally upon late flowers of *Heracleum sphondylium*. I have taken it in Suffolk, Kent and Derbyshire. The perfect insect appears in May and June. The larva is uncertain in its appearance. In 1859 it was by no means uncommon; in 1860 it seemed to have entirely disappeared. It is frightfully infested by ichneumons, and not above one in ten or twenty escapes.

Description of the Larva of Eupithecia trisignata, H.-S.—Rather short and stout, tapering but slightly towards the head. Ground colour pale green. Central dorsal and subdorsal lines dark green, latter broader than the former. Spiracular line waved, whitish. Segmental divisions yellowish. Head black when at rest, curved considerably inwards. Anal tip of central dorsal line purplish. Back wrinkled, sprinkled with a few very short bristly hairs. Belly green, with a central yellowish line. Pupa enclosed in an earthen cocoon. Thorax pale olive. Wing-cases pale olive, very transparent. Abdomen tapering, reddish yellow; tip and divisions blood-red.

Two years ago Mr. Greene and I were searching for larvæ of *E. tripunctata* in Derbyshire, when I stumbled upon two larvæ which I at once saw were those of no British *Eupithecia* I had ever yet seen, their black heads giving them a most distinct appearance. Mr. Greene was afterwards fortunate enough to meet with more, and from them we bred what turned out to be *E. trisignata, H.-S.* The larva feeds in September on flowers and seeds of *Angelica sylvestris*, in company with, and in similar situations to, *E. tripunctata*. Mr. Greene and I have only met with it in Derbyshire. In Switzerland it feeds on flowers

of *Heracleum sphondylium*. The perfect insect appears in June and July.

H. HARPUR CREWE.

Rectory, Drayton Beauchamp,
near Tring, May 6, 1861.

Capture of Notodonta carmelita near Cockermouth.—My brother, I. S. Mawson, in the month of April last, captured near Keswick eight splendid specimens of *Notodonta Carmelita*. Three specimens are in the cabinets of Messrs. Tiltman and Nicholson, of Whitehaven, one in the cabinet of Mr. John Walker, of Cockermouth, the rest grace my own cabinet. He has also taken near the same place *Ceropacha ridens* dark variety, (1), *C. flavicornis* (2), *Biston prodromaria* (5), and several *Aecasis viretaria*. I have sent this note thinking that the above captures, especially those of *N. Carmelita*, might be worth recording in the 'Zoologist,' as I believe it is now some years since that insect has been taken in the same locality, and never before in so large a number by one person near here.—*George Mawson ; Gill House, Cockermouth, May 20, 1861.*

Description of the Larva of Triphæna fimbria.—Rolls in a ring when touched, feigning death and falling off its food-plant. Smooth, cylindrical, gradually diminishing in size from the 12th segment towards the head, which is remarkably small for the size of the larva. Head shining, clay-brown, mottled and reticulated with darker brown: body clay-brown, mottled, velvety; the 2nd segment has three narrow longitudinal pale lines; on each side of each segment there is an indistinct oblique pale stripe; along the back are a median series of obscure darker marks, seated in the interstices of the segments; spiracles pale, each seated in a dark brown mark; on the 12th segment a pale and a dark transverse mark; belly, legs and claspers paler than the back. The egg of this beautiful moth is laid on *Betula alba* (birch) and *Salix capræa* (sallow) and several other trees early in the autumn, and the young larva remains on the tree until the approach of winter, when it descends to the ground and hibernates. In the spring it ascends the trunk every night as soon as it is dark, and devours the newly expanded leaves, then very small, again retiring to the ground before the approach of daylight. It is generally full fed before the middle of May, when it finally changes to a pupa on the surface of the ground. When full fed it is very conspicuous on the almost naked twigs of the birch, and is readily procured by collectors who seek it by lamp-light. I am indebted to Mr. Thomas Hockett for this and the two following larvæ.—*Edward Newman.*

Description of the Larva of Agrotis agathina.—Does not roll itself in a ring when touched, but falls off its food, and, bending its body slightly at both extremities, remains motionless a short time, feigning death. In form almost uniformly cylindrical, but slightly decreasing in size at either end, smooth and velvety: the head rather small and very shining pale dull green or dull brown, with two obscure longitudinal darker markings: body of different ground colour in different individuals, the prevailing hues green and brown, in all instances adorned with five longitudinal white stripes, all of which are more or less interrupted by folds in the skin, especially at the interstices of the segments; three of these are brighter and more distinct than the remaining two, and may be called dorsal, the remaining two are lateral, and are tinged more or less with the ground colour of the body: the median stripe is found, on close examination,

to be composed of a series of shuttle-shaped markings placed end to end; the next stripe on each side is bordered on its upper or dorsal margin with velvety black, massed on each segment into a conspicuous blotch; the lower margin is also bordered, but less conspicuously, with black; the lateral stripe is broader and more diffuse, as well as less conspicuous, than the others; it encloses the spiracles, which are ranged just within its upper margin, excepting the last and last but one, which are placed above the stripe: by these five stripes the dorsal surface of the body is divided into four nearly equal compartments, all of which are alike in ground colour, whatever its tint, and are delicately mottled with velvety black; the under surface bordering the lateral stripe partakes of the same colour, but the belly, as well as the legs and claspers, are paler, having a semi-transparent appearance. Feeds on *Calluna vulgaris* (the common ling) principally at night, when it is swept off the ling in early spring by collectors who are acquainted with its habits; it is full fed about the end of May. The perfect insect appears in autumn, as soon as the food-plant is in full flower, more especially selecting such plants as grow beneath the shelter of trees. Mr. Morris informs me that he finds it at Wickham, under the shelter of fir trees.—*Edward Newman*.

Description of the Larva of Agrotis porphyrea.—Uniformly cylindrical. Head very shining, pale brown: body umber-brown, paler between the segments: on the back are three series of linear clearly defined whitish marks placed end to end; the first series is median, and extends from the 3rd to the 10th segment, both inclusive, consisting therefore of nine spots; the first of these, that on the 3rd segment, is circular, that on the 4th oval, the rest linear; on each side of this series is a lateral series of similar whitish linear spots, and these commence on the 5th segment, and extend to the 13th; below these lateral series of whitish spots there is a whitish stripe which includes the spiracles, which are black; legs very shining, pale brown, spotted with black: claspers pale. Feeds on *Calluna vulgaris* (the common ling), only in the night. The eggs are laid and hatched in the autumn, and the larva hibernates: in April it begins to feed again and is full-fed in May; it then spins a slight cocoon [on the surface of the ground, and therein changes to a pupa. The perfect insect appears about midsummer.—*Id*.

Description of the Larva of Agrotis lucerneæ.—Rolls in a ring when touched feigning death and falling off its food-plant. In shape almost uniformly cylindrical: surface smooth, velvety: head shining, the triangular plate intensely black; the hemispheres mottled with black and gray-brown: the colour of the body is a mottled mixture of gray-brown and black-brown, the darker colour assuming somewhat the form of a double series of V-shaped markings along the back, the apices of the Vs directed towards the head; the space within each V only a shade paler than the V itself, but terminating at its point in a very decided pale spot, which has a black dot in the middle, the dot emitting a black bristle: the legs black and shining; the claspers pale; the spiracles almost white, but surrounded by a black space. In confinement these larvæ, for which and those of the species which immediately follows I am indebted to Mr. Greening, of Warrington, fed voraciously by night on the leaves of *Campanula rotundifolia* (common harebell), but concealed themselves in peat earth by day: they were full fed and finally buried themselves on the 1st of May.—*Id*.

Description of the Larva of Agrotis Ashworthii.—Rolls in a compact ring, feigning death and falling off its food-plant when touched. In shape almost uniformly cylindrical, quite smooth and velvety: head bright red and shining: body uniformly coloured; generally smoky green; in some specimens olive-green, in others smoke-

coloured, with scarcely a perceptible shade of green: on the dorsal surface of each segment are two somewhat distant conspicuous markings of an intense velvety black: the figure of each of these markings is that of a longitudinally elongated square or parallelopipedon, its limits always clearly defined but not very regular; near the head these markings become narrower or more linear, and the pair on the 12th segment are also narrow and placed obliquely: the legs are red-brown and very shining. These larvæ feed on *Festuca ovina*, several species of *Hieracium*, *Cistus Helianthemum*, *Thymus Serpyllum* (wild thyme), *Scabiosa succisa*, *Solidago Virgaurea* (golden rod), *Poterium Sanguisorba* (burnet), &c.; and in confinement revel on *Salix caprea* (sal-low), especially the catkins. They feed by night only, and bury themselves in the earth by day. They were full fed and finally disappeared beneath the earth on the 8th of May.—*Edward Newman*.

Life-Histories of Sawflies, translated from the Dutch of M. Snellen Van Vollenhoven. By J. W. MAY, Esq.

NEMATUS HORTENSIS, *Hartig*.

Imago: *Hartig. Blatt. und Holzwespen*, No. 24, p. 127.

Larva undescribed.

Nematus luteus, antennis, cervice, thoracis dorso plus minus, segmentorum abdominalium linea aut macula trigona nigris, pedum posteriorum tibiis tarsisque fuscis.

In the first week of September I found some tenthredinidous larvæ of various sizes, in my garden at Leyden, feeding on *Robinia pseud-acacia*, commonly called *Acacia*. It seemed to me singular that they should be feeding on the leaves of this foreign tree, and which I had not hitherto observed to be attacked by any species of insect, but the comparatively large number of larvæ which I found together (I counted fourteen), and the small size of the majority, contradicted the supposition that they had accidentally wandered from some other tree or shrub on to this one; moreover I was unable to detect any similar larvæ on other plants in the neighbourhood.

The largest somewhat resembled in form and colour the larvæ of the preceding species,* but on examination several points of difference were observable. They had twenty legs, the same as the last; they were also of a pale green colour, with a brown head, but this latter was of a lighter tint; there was no black dorsal stripe; spots on the side were scarcely discernible, and the supra-anal horns were not pointed as in *N. cæruleocarpus*, but consisted of two flat vertical wedge-shaped yellow projections with brown markings (fig. 3).

* *N. cæruleocarpus*.

The youngest larvæ ate irregular holes in the middle of the leaves, the more advanced ate from the margin of the leaf towards the midrib, which was at last the only part of the leaf left. The head (figs. 1 and 2) was of a greenish pale brown colour, with a transverse and a longitudinal stripe over the crown, both of an ochreous-brown; the jaws were of a colour resembling burnt ochre, the eyes were seated in round black spots; some small gray hairs projected upwards from the head; the skin of the body was deeply wrinkled, shining, pale green, and appeared as if transparent, so that the white tracheæ were clearly visible on both sides; the spiracles had green margins. The six thoracic legs were glassy green; the twelve abdominal, as also the two anal prolegs, of the same colour as the body. The hind pair of thoracic legs were generally retracted, and not resting on the leaf; the last pair of abdominal legs were also often withdrawn under the skin, as I have endeavoured to represent in fig. 2. On the last segment of the body were observed the above-mentioned yellow projections with brown margins; this segment was also covered with short white hairs. As the larvæ had but just moulted, and acquired a new skin, the head, as well as the body and the anal horns, were pale green and shining; before they took to the earth my larvæ assumed a darker tint, and the green began to pass into brown. Their greatest length was $7\frac{1}{2}$ lines, and the breadth 1 line.

From about the 17th to the 20th of September these larvæ crept into the earth, which I had given them for the purpose, and spun themselves simple brownish black cocoons, which it is unnecessary to figure. On the 25th of September I found three perfect insects had made their appearance. On the 1st of October two others appeared, and on the 2nd I counted two more. They were all females. The remainder died in the larva state, or were found dried up in the cocoons.

This *Nematus* is by no means a rare insect, and appears to occur in various parts of the country. Although I have never met again with the larvæ, and thus have never bred any males, I have no doubt that the male insect I am about to describe belongs to this species, since I have frequently taken it in gardens in company with the female. The perfect insects are from $2\frac{1}{2}$ to three 3 long, and have an expansion of 6 lines, the males being smaller than the females. They belong to that division of the *Nemati* which have the anterior portion of the anal cell*

* The sawflies are distinguished from all other Hymenoptera by the anal cell being divided longitudinally into two parts; to the anterior of these Hartig has given the name of *Area lanceolata*, in which he is followed by the author of these descriptions.

petiolated, and the first joint of the hinder tarsi but slightly expanded. The head is pale ochreous-yellow; the eyes black, and a black spot on the crown of the head, in which spot are found the ruby-coloured ocelli; the size of this mark varies in different individuals. The mandibles are brown; the antennæ black. The under side of body is ochreous-yellow, with the exception of two small black spots on the sides beneath the wings; the dorsum is a mixture of yellow and black. On the thorax, the greater part of the central lobe and the two lateral lobes, as also the metathorax, with the exception of the post-scutellum, are black, and on each segment of the abdomen is a shining, black, transverse band (fig. 4). In the male the black colouring is more diffused, so that both the scutellum and post-scutellum are frequently black. In this sex also the bands on the abdomen present themselves as black triangular marks, having the apices in the direction of the terminal segment (fig. 5). The first segment of the abdomen in the male is excised or notched, so that there is a triangular opening between the corneous integument of that segment and that of the second, which opening is filled in with a white membrane.

The legs are yellow in both sexes, with light brown tarsi on the first and second pairs, and light or sometimes dark brown tibiæ and tarsi on the posterior; in the males these tibiæ are sometimes yellow on the under side. The borer of the female is black, and projects somewhat beyond the abdomen. Viewed under the microscope the saw appears very simple, having a curved back and a straight edge with irregular teeth projecting in a backward direction, and which do not greatly exceed fifteen in number. The ovipositor is curved, and shuts with its concavity on the rounded back of the saw; its shape can be seen in fig. 6, that of the saw in fig. 7.

I am unable to say anything respecting the egg or the manner of ovipositing. I have no doubt this sawfly has more than one brood in the year; I observed a second generation in the month of July at Brummen, and believe in the possibility of a third.

I thought it as well to retain our term, anal, for the whole cell, and to designate Hartig's *Area lanceolata* as the anterior portion of the anal cell, leaving the remainder to be spoken of as the posterior portion. The German author employs the different forms assumed by this anterior portion of the anal cell (which are very constant) to separate the genera of *Tenthredonidæ* into groups. See Hartig's '*Holz-und Blattwespen*,' pp. 25 and 40; and for the figures of the various forms of the cells, tab. ii. figs. 32 to 37.—*J. W. M.*

Strange Habits of Bees in Peru.—Mr. Sandison, son of the Rev. Mr. Sandison of this place, sends the following interesting fact in Natural History from Arequipero, Peru:—"A few years ago a German got out a few hives of bees, an insect formerly unknown here. The first year he obtained a plentiful supply of honey, but year by year it decreased, until now the animals will hardly collect any. And why? Our climate is so equable that flowers can be had all the year round; and the sagacious animals, having discovered this fact, have evidently lost the instinct of hoarding honey for a winter that never comes."—*Brechin Advertiser.*

*Agricultural Ants.**—The first letter was dated Long Point, Texas, December 29, 1860. The species of Formica which Mr. Lincecum named "agricultural" was stated to be a large brownish red ant, dwelling in paved cities, a farmer, thrifty and healthy, and diligent and thoughtful, making suitable and timely arrangements for the changing seasons. When he selects a situation upon which to locate a city, if on ordinarily dry land he bores a hole, and surrounds it with a low circular mound three or sometimes six inches high, its outer limits three to four feet from the entrance. But if the location is on low flat land liable to inundation, though the ground may be perfectly dry when he does the work, he elevates his mound in a sharp cone to the height of fifteen or twenty inches, sometimes even more, and places the entrance near the apex. Around this he clears the ground of all obstacles, and levels and smooths the surface to the distance of three or four feet from the gate of the city. On this space not a spire of any green thing is permitted to grow, except a single species of grain-bearing grass, which, having planted, he nurses and cultivates with constant care, cutting away all other grasses and weeds that may spring up. The cultivated grass grows luxuriantly, producing a heavy crop of small white flinty seeds, which under the microscope very much resembles the rice of commerce. When it gets ripe it is carefully harvested and carried by the workers, chaff and all, into the granary cells, where it is divested of the chaff and packed away, the chaff being taken out and thrown beyond the limits of the cleared space. In wet weather these stores are liable to become damp, and to sprout and spoil; and if this occurs they bring them out to dry on the first fair day, carrying back all the sound seeds, and leaving the sprouted ones to waste. Mr. Lincecum stated that in the sand beds overlying portions of rock in his peach orchard there were five cities of these agricultural ants—evidently quite ancient cities—which he had observed for twelve years. The cities were invariably planted at the proper season with ant rice, and it was accordingly seen springing up in the farm circle every year about the 1st of November. He maintained that there can be no doubt of the fact that the peculiar grain-bearing grass was intentionally planted. In a subsequent letter, dated March 4, 1861, replying to this question from Mr. Darwin: "Do you suppose the ants plant seeds for the ensuing crop?" Mr. Lincecum replies:—"I have not the slightest doubt of it. I have at all seasons watched the same ant cities during the last twelve years. I visited the same cities yesterday, and found the crop of ant rice growing finely, exhibiting the signs of high cultivation." "We have," he continues, "not only agricultural ants in Texas, but a species that is a regular horticulturist. These plant with shade-trees the mounds of sand thrown out from their cells and extensive tunnels. They cannot stand our summer sun, nor travel over the unshaded plains to bring in provision, and hence the

* Extracts from letters addressed by Gideon Lincecum, Esq., to Charles Darwin, Esq., on the habit of the agricultural ant of Texas.

necessity of tunnels or under-ground passages to the trees and patches of herbaceous plants that yield the leaves upon which they subsist. The excavations sometimes extend outwards 400 or 500 yards. To allow sufficient space for carrying a piece of leaf through it as wide as a dime, or sometimes larger, the tunnel is generally an inch in diameter, terminating most commonly under a shady tree, or in a garden or corn field. When they enter a garden in this way they seldom fail to ruin it, all kinds of fruit trees, flowering shrubs and garden vegetables being trimmed of their leaves."—*Report of Linnean Society's Proceedings, in 'Gardeners' Chronicle,' May 18, 1861.*

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

May 6, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the respective donors:—‘Transactions of the Linnean Society,’ Vol. xxiii. Part 1; presented by the Society. ‘Proceedings of the Royal Society,’ Vol. xi. No. 43; by the Zoological Society. ‘Proceedings of the Society, Part 3, 1860; by the Society. ‘Observations on the Neuration of the Hind Wings of Hymenopterous Insects, and on the Hooks which join the Fore and Hind Wings together in Flight,’ by Miss Staveley; by the Author. The ‘Zoologist’ for May; by the Editor. ‘Notes on the Generative Organs, and on the Formation of the Egg, in the Annulosa,’ Part 1, by John Lubbock, Esq., F.R.S.; by the Author. ‘The Journal of the Society of Arts’ for April; by the Society. ‘The Athenæum’ for March and April; by the Editor. ‘The Entomologist’s Weekly Intelligencer,’ Vol. ix. and Nos. 235 to 239 inclusive; by H. T. Stainton, Esq.

Elections.

A. Murray, Esq., of Scotland Street, Edinburgh, was elected a Member; and James Arthur Laing, Esq., of Paragon Road, Blackheath, was elected a Subscriber to the Society.

Exhibitions.

Mr. Stevens exhibited some specimens of *Saperda oculata* from the Cambridge-shire fens, and observed that the species had not previously been taken in this country for about twenty years. He also exhibited two beautiful *Cetonidæ*, viz., *Tmesorrhina Thoreyi* and *T. Iris*, from Sierra Leone; and three fine species of *Paussus*, from the coast of Malabar.

Dr. Wallace exhibited a specimen of *Acherontia Lethe*, said to have been found alive by a young lady at East Cowes. Being a native of the East Indies, it must have been accidentally imported into this country.

Mr. Haward exhibited a fine example of *Euryporus picipes*, found under decaying leaves on Sanderstead Downs.

Mr. Machin exhibited some interesting Micro-Lepidoptera, amongst which were *Stigmonota interruptana*, *Coleophora vulneraria*, an apparently new species of *Gelechia*, &c.

Mr. Stainton exhibited larvæ of two species of *Micropteryx* mining in birch-leaves.

He remarked that they were perfectly apodal, tapering towards the tail. The mine, at first a slender gallery, eventually became a large blotch, in which the excrement assumed the peculiar appearance of a coil of black thread. These larvæ had often before been observed by Mr. Stainton and other Micro-Lepidopterists, but had always been neglected by them under the idea that they were Coleopterous.

In reply to a question from Mr. Westwood, Mr. Stainton stated that the Lepidopterous larvæ to which these were most nearly related were those of the genus *Antispila*.

Improved Breeding-cage.

Dr. Knaggs brought for exhibition one of the cages which he used for rearing the larvæ of Lepidoptera. It consisted of a glass cylinder, covered at its upper aperture with muslin fastened by twine or thread, in preference to elastic India-rubber rings, which are apt to break from dampness or long-continued contact with another surface; of an unglazed earthenware plate, with a perforation in the centre of sufficient size to admit of the food-plant being dragged through, so as entirely to block it up; twigs, &c., requiring to have a strip of linen twisted round them before they are passed through the opening; and of a jam-pot or other receptacle for water.

In his opinion there were many advantages over any breeding-cage he had hitherto seen or heard of, of which the absence of putrid water, which must always occur where damp sand is used, was the most important; dead larvæ, frass, &c., could be at once removed; there was a good footing on the unglazed plate, on which larvæ could not only crawl with ease, but could not become entangled, as to their legs, with webs, grains of sand (damp or dry), or cotton wool; by simply lifting cage, larvæ, food and all, from the water, the ends of the plants might be clipped off with a pair of scissors, and the cage placed into another jam-pot of pure water; and he suggested that if this were done about every other day the food would keep perfectly fresh for at least a fortnight; in fact, although the plant obtains the amount of moisture it requires, the cage remains dry. Amongst other advantages may be mentioned facility for the observation of larval habits; great economy of time and labour; great economy in price, thereby allowing a far larger number of cages for the same expenditure, so that species, and even individuals when necessary, may be kept separate; cleanliness, free access of air and light, &c.

On the score of economy he strongly recommended them; the cylinders, being the cut-off bottoms of glass shades, were of course next to unsaleable articles, so that, at any rate at present, they might be obtained for a sum varying from a penny to a shilling, according to size.

With regard to the unglazed plates (the ordinary state in which stock is kept), they might be got from the manufacturers; he would advise, however, that those of the best make should be procured, as being flatter; ingenuity would soon make holes in them, which might be done either by a drill or by a stock and countersink. The prices he paid for the best unglazed plates vary from 1s. 6d. to 2s. 6d. per dozen, according to size.

The following papers were read by the Secretary:—

“Notes on the Distribution of Insects in the Channel Islands,” by F. Walker, Esq.

“On the *Euphorbia*-infesting Coleoptera of the Canary Islands,” by T. V. Wolleston, Esq.—*E. S.*

NOTICES OF NEW BOOKS.

1. *The Origin of Species, by means of Natural Selection; or, the Preservation of Favoured Races in the Struggle for Life.* By CHARLES DARWIN, M.A., F.R.S., &c. Third Edition. 538 pp., 8vo. London: John Murray, Albemarle Street. March, 1861. Price 14s.
2. *Natural Selection not inconsistent with Natural Theology; or, a Free Examination of Darwin's Treatise on the Origin of Species, and of its American Reviewers.* Reprinted from the 'Atlantic Monthly' for July, August and October, 1860. By ASA GRAY, M.D., Fisher Professor of Natural History in Harvard University. A Pamphlet of 55 pp., large 8vo. London: Trübner & Co., Paternoster Row. Boston: Trickner & Fields. 1861.
3. *On the Origin of Species by means of Organic Affinity.* By H. FREKE, A.B., M.D., T.C.D. 135 pp., large 8vo. London: Longman & Co., Paternoster Row. 1861.
4. *Species not Transmutable, nor the Result of Secondary Causes; being a Critical Examination of Mr. Darwin's book intituled 'Origin and Variation of Species.'* By C. R. BREE, M.D., F.L.S. 256 pp., 8vo. London: Groombridge & Sons, 5, Paternoster Row. September, 1860. Price 3s. 6d.

AN Editor professing to keep up a record of the current literature of his subject, owes his readers some apology for omitting for so many months the notice of Mr. Darwin's volume on the 'Origin of Species.' The first edition has now been before the public some time, and has probably ere this been perused by most of the readers of the 'Zoologist.' The difficulty of doing anything like justice either to the subject or the author of the work, within the ordinary dimensions of a review, has influenced us in withholding a notice up to the present time; but the great interest it has awakened in the mind of the scientific public, and the extensive controversy that has arisen out of it, including several voluminous publications and reviews expressing a variety of sentiments, and a rejoinder to some of the objectors in Mr. Darwin's third edition, demand that we should remain silent no longer.

To attempt to give a full exposition of the controversy is beyond our limits; the difficulty of epitomising such a closely-connected

work, which is in itself but an abridgment of a larger unpublished work, has made us keep silent so long; and in now taking up our pen we feel profoundly the difficulty we are under in attempting to criticize any of Mr. Darwin's views; but, with the amount of detail in which he has advanced them, we cannot do this in a periodical magazine, and must therefore attempt little more than a brief summary of the four books before us, keeping any views we may have formed on their subject as much in the back ground as possible. They are singularly diverse in character. Mr. Darwin's book, considering the nature of the subject, is remarkably concise and readable, without the slightest attempt at ornamentation or elegance, beyond what the easy expression of an overflowing power of thought naturally possesses. The author, moreover, has that rare qualification of being able to think and write upon more than one phase of his subject: no difficulties that strike him are slurred over; each one is fairly and boldly met; entire chapters are devoted to self-imposed objections to the theories advanced: indeed, the whole work has more the character of an equally-balanced controversy than the pleading of an author on behalf of his subject. Criticism is thus disarmed, and the critic feels he can do little more than feebly reiterate what the author has said either for or against himself. We cannot feel, in reading Dr. Bree's work, that he fully appreciates the quality of his antagonist, or treats him fairly. Dr. Bree's style is very florid and elegant; but we think he unwisely sacrifices closeness and exactness of thought and expression—which are so fascinating in Mr. Darwin—for a sort of elegant flippancy, which, in dealing with the subject, is painful, as it is out of place. The following sentence, at page 151, will explain our objection:—"I do not think I need say one word in refutation of an hypothesis which I might simply designate profane; but I will leave the matter to the cool reflection of those who may read a statement which shocks and outrages every proper feeling, as much as it does violence to our reason and common sense." There is a general want of close accuracy throughout the whole book; and as an example we may notice Dr. Bree's carelessness in entirely misquoting the title of the work he is reviewing.

Again, Dr. Bree states, at page 189, reiterates over and over again, and implies it by the title of his work, that Mr. Darwin believes in the transmutability of one highly-developed form to another, which is an unfair inference from the very distinct theory (however great its falsity) of the common origin of widely-differing highly-developed forms from some vastly-distant and more elementary progenitor.

We disagree with the deductions Mr. Darwin draws, but should nevertheless like to see him fairly treated. We cannot admit that Dr. Bree does this, or goes the right way to work successfully to gainsay the issues of the argument; here and there he twitches at a weak thread, without, however, doing much damage to Mr. Darwin's elaborately-woven fabric.

Dr. Asa Gray's pamphlet is a graceful summing up of the arguments *pro* and *con* Natural Selection, in favour of the views enunciated by Mr. Darwin. He also takes up a further stage of the question, which the author of the 'Origin of Species' passes by almost unnoticed, and endeavours to prove the compatibility of the development of species by natural selection with final cause and design.

Dr. Freke's little book differs widely from any of the others, both in its matter and style. After Mr. Darwin's clearness and Dr. Bree's eloquence it reads most stiffly. Parentheses, here and there, are all very well and admissible, as a means of avoiding an extra sentence, but under any circumstances are merely a licensed deviation from grammatical expression, and when too freely indulged in become very objectionable. Dr. Freke throughout his book is painfully parenthetical, and every now and then, in endeavouring to express too much with a few words, loses himself in a whirlpool of parentheses. An idea expressed by two or three sets of parentheses, fitting into each other, must be lost to an ordinary reader, and involves the use of a greater number of words than good common-place English. Italics may also, now and then, be used to define the exact point of a sentence; but when every third or fourth word, or bit of a word, is written in Italics, this *finesse* of expression may easily be mistaken for pedantry. Dr. Freke considers himself a supporter of Mr. Darwin's deductions, but on different grounds: he appears to believe that species have been gradually developed from one primordial form, under laws of organic affinity somewhat parallel to those laws of chemical affinity defining the individual character and composition of inorganic compounds.

Mr. Darwin's volume, now published, is merely the abstract of a larger work, the author informs us, in his Preface, he has been occupied upon since his return from the voyage of the exploring ship 'Beagle,' and promises to complete it in two or three years. By it we are to be supplied with the details of the facts, forming the basis of his theory, he has been patiently accumulating and reflecting upon for more than twenty years.

To express Mr. Darwin's views in a few words :—From certain facts he observed regarding the distribution of the inhabitants of South America, and the relations of the present to the past inhabitants of that continent, he has been led through a course of observation and reflection, to the conclusion that organic bodies now individualized under the term species were not independently created, but are the descendants of a few much simpler forms, modified and multiplied under circumstances parallel with those now existing; that there has been no break between the present and the geological epoch during which the organic forms with which we are now surrounded were in process of manufacture; that this advancement and modification indirectly result from the power of organic reproduction being vastly in excess of the means of sustenance, which, in the resulting competition for existence, give variations from the normal type, having any profitable quality in the economy of life, the advantage both as to existence and power of reproduction; the quality of variability being inherited, and the steps of improved variation accumulated, through several generations, produce as a result the multiplication and advancement of species. Intermediate links, or those that are too nearly resembling their brethren to settle down into distinct arenas of nature, strive with them for the mastery, the weaker becoming extinguished, those that remain appropriating subdivisions of the district of nature occupied by their common parent, according to their new gradations of habit and functions; and the special qualities of each, being reacted upon by their specialized habits of life, become intensified, first into specific differences, and subsequently, by throwing off series upon series of varying descendants, take higher rank in what Mr. Darwin says is the genealogical order of nature.

The matter of the work, consisting of fourteen chapters, seems to be naturally separable into three divisions — 1st, direct evidence in favour of the theory; 2nd, collateral or constructive evidence; 3rd, the difficulties of the theory. Chapter II., on variation under nature; Chapter X., on the geological succession of organic beings; part of Chapters XI. and XII., on geographical distribution, and the affinity of the productions of the same continent; and Chapter XIII., on the mutual affinities of organic beings, deal with *primâ facie* evidence. Chapter I., on variation under domestication; Chapter III., on the struggle for existence; Chapter IV., on natural selection; and Chapter V., on the laws of variation, relate to less direct evidence, and the assumed active processes connected with the elimination of species. Chapters VI., VII., VIII. and IX., and part of Chapters XI. and XII.,

relating to instinct, hybridism, the imperfection of the geological record, and anomalies in geographical distribution, relate more particularly to the discussion of difficulties and their attempted explanation.

With reference to those facts which Mr. Darwin considers afford him natural evidence in favour of the gradual multiplication and progression of organized beings: Chapter II. relates to the variability of species, as observed under a state of nature, as individual differences determined by peculiarities of habitat, instanced in dwarfed plants on alpine summits, and the quantity and quality of fur of animals having a wide range determined by temperature, and the dwarfed condition of certain shells in the brackish waters of the Baltic; also individual differences under identical circumstances, as individual variations in the plumage of certain birds, the want of uniformity in the muscles of the individual larvæ of certain insects.

Again: the difficulties naturalists have met with in defining the characters which distinguish a species from a variety he says imply that they are but different degrees of the same kind of difference, and that, the consanguinity between varieties and their parent species being acknowledged, genealogical relationship between kindred species, and again between the higher grades of classification, is fairly implied. At page 53 (third edition) Mr. Darwin says, "Certainly no clear line of demarcation has yet been drawn between species and sub-species, *i. e.*, the forms which in the opinion of some naturalists come very near to, but do not arrive at the rank of species; or, again, between sub-species and well-marked varieties, or between lesser varieties and individual differences. These differences blend into each other in an insensible series, and the series impresses the mind with an actual passage." Again: that the kind of relationships existing between varieties and their acknowledged parent species has, in each natural series, a striking parallel resemblance to the relationship subsisting between the species and the higher grades of classification; for the number of the varieties of a species is generally proportionate to the size of its genus, each species of large genera having a greater number of varieties than each species of small genera, exhibiting a parallel relationship between the affinity of the variety to its species with that of the species to its genus, implying in the resemblance an inherited property: and that allied species once held the same relationship to some common progenitor that varieties now do to each of their acknowledged parent species.

At page 57 (third edition) is stated, "From looking at species only as strongly-marked and well-formed varieties, I was led to anticipate

that the species of large genera, in each country, would oftener present varieties than the species of the smaller genera; for wherever many closely-related species (*i. e.* species of the same genus) have been formed, many varieties or incipient species ought, as a general rule, to be now forming; where many large trees grow, we may expect to find saplings; where many species of a genus have been formed, through variation, circumstances have been favourable to variation, and hence we might expect that the circumstances might still be favourable to variation. On the other hand, if we look at each species as a special act of creation, there is no apparent reason why more varieties should occur in a group having many species than in one having few."

From the gradations of affinity between the species of the successive geological formations, more especially evident in the gradual and even increase upwards in the proportion of existing to extinct species of the tertiary deposits; from the extinction of species never to reappear, but to be replaced with an allied form more advanced in organization; from the progressive divergence in character between recent members of a group, as compared with its species during the geological period; and from the geological succession of the same types within the same geographical areas, implying the inherited relationship of the successive species within those districts; Mr. Darwin implies the genealogical succession of organized beings through the several geological periods, in preference to their being the result of a series of distinct acts of creation. On this subject Mr. Darwin says, at page 368 (third edition):—"Mr. Clift, many years ago, showed that the fossil mammals of the Australian caves were closely allied to the living mammals of that continent. In South America a similar relationship is manifest, even to an uneducated eye, in the gigantic pieces of armour, like those of the armadillo, found in several parts of La Plata; and Professor Owen has shown, in the most striking manner, that most of the fossil mammals buried there in such numbers are related to South American types. This relationship is more clearly seen in the wonderful collection of fossil bones made by MM. Lund and Clausen in the caves of Brazil. I was so much impressed with these facts that I strongly insisted, in 1839 and 1845, in this law of the succession of types,—in this wonderful relationship, on the same continent, between the dead and the living. Professor Owen has subsequently extended the same generalizations to the mammals of the Old World. We see the same law in this author's restorations of the extinct and gigantic birds of New

Zealand; we see it also in the birds of the caves of Brazil. Mr. Woodward has shown that the same law holds good with sea-shells, but from the wide distribution of most genera of mollusks it is not well displayed by them. Other cases should be added, as the relations between the living and extinct land shells of Madeira, and between the extinct and living shells of the Aralo-Caspian Sea. Now, what does this remarkable law of the succession of the same types within the same areas mean? He would be a bold man who, after comparing the present climate of Australia and of parts of South America under the same latitude, would attempt to account on the one hand by dissimilarity of physical conditions for the dissimilarity of the inhabitants of these two continents, and on the other hand by similarity of conditions for the uniformity of the same types in each during the late tertiary periods. Nor can it be pretended that it is an immutable law that Marsupials should have been solely or chiefly produced in Australia, or that Edentata and other American types should have been solely produced in South America; for we know that Europe, in ancient times, was peopled by numerous marsupials; and I have shown in the publications above alluded to, that in America the law of distribution of terrestrial mammals was widely different from what it now is. North America formerly partook strongly of the southern half of the continent, and the southern half was formerly more closely allied than it now is to the northern half. In a similar manner we know, from Falconer and Cautley's discoveries, that Northern India was formerly more closely related, in its mammals, to Africa than it is at the present time. Analogous facts could be given in relation to the distribution of marine animals."

These facts are very startling, and would be still more so if the relationship upon which Mr. Darwin lays so much stress could be traced through any extent of contiguous geological formations. Most of the examples adduced refer to the upper tertiary and post-tertiary beds, and only support contiguity of descent with existing species. So far, indeed, it is but fair, on Mr. Darwin's own assumption, to take the evidence he brings forward, respecting Europe being peopled in ancient times by marsupials which are now limited to Australia, as implying a break in the genealogical thread; for if marsupials did not exist in Australia during the age they peopled Europe, we have a strong plea for assuming the subsequent special creation of the modern Australian kangaroo and its allies; and if the far isolated continents of Europe and Australia were contemporaneously peopled with marsupials, it affords a striking exception to the evidence in support of

the limitations of special types to special geographical areas. Again: the pachydermatous monsters of tertiary Europe have no recent representatives on that continent; but this perhaps might be fairly accounted for on Mr. Darwin's theory of extinction through climatal fluctuations; and we might expect to find their nearest allied descendants driven down to warmer latitudes of the same continent, as plants were, according to Mr. Darwin, during the glacial period; but it is a fact worthy of note that America possesses in its tapir a much nearer ally to the extinct *Dinotherium* of Europe than any recent species on the old continent.

Mr. Darwin admits the imperfection of his evidence; of the evidence, if it were perfect, as it stands, presenting grave objections; but says that the geological record is imperfect, does not contain a complete record of the succession of organic life; that the average circumstances attending the deposition of the geological strata were such as to render a complete record impossible, and that our acquaintance with this imperfect record is infinitely small, but that the broken scraps of complete evidence we here and there get give us the warrant for assuming the missing links.

Dr. Bree will not admit this,—will not allow Mr. Darwin an era of life in which to perfect his fauna as we find it at the apparent dawn of geological life, or unrecorded periods in which to graduate transitions in organic structure which here and there stagger him with their abruptness. He demands that the geological record as it stands must be taken as complete evidence, and that the sudden changes it here and there displays, in the past history of organic life, are utterly incompatible with Mr. Darwin's theory.

The next division of natural evidence upon which Mr. Darwin rests is that supplied by the phenomena of the distribution of plants and animals, treated of in Chapters XI. and XII. Chapter XI. commences, "In considering the distribution of organic beings over the face of the globe, the first great fact that strikes us is that neither the similarity nor dissimilarity of the inhabitants of various regions can be accounted for by their climatal and other physical conditions. Of late almost every author who has studied the subject has come to this conclusion." The facts specially noted are—the arbitrary character, as regards physical conditions, of the distribution of genera and species along the same zones of latitude; the affinity of the productions of the same continent, and the distribution of species as being mainly dependant on geographical peculiarity, especially as to geographical barriers to free migration, defining the range of species,

as for example small islands, far isolated from continents, being destitute of mammals and batrachians, incapable of migration across any extent of sea; the great difference oftentimes observable in the marine floras and faunas of closely-contiguous districts, separated by lofty and contiguous mountain ranges, deserts or even large rivers, acting as barriers to free migration; and the great differences in the marine floras and faunas of some closely-contiguous seas that are separated by barriers of land, preventing free intermigration; again, in the affinity of the productions of the same continent or sea, though the species themselves are distinct at different periods and stations, as implying not only genealogical relationship, but an uninterrupted existence, within the district, for a length of time sufficient for the development of the allied species from a common parentage. Chapter XI. contains also some interesting details respecting the means of the geographical dispersal of species; but this we shall again refer to when we consider the part of Mr. Darwin's work relating to his explanation of difficulties. Chapter XII., on the mutual relation of organic beings, aims at assigning community of descent as the cause of common points of resemblance, the different degrees of resemblance represented by the terms variety, species, genus and class, representing various parallel degrees of consanguinity. Mr. Darwin says that these different grades are difference of measure, not of kind; that the amount of difference recognised as necessary to define these different groups is arbitrary, and various in different parts of the organic kingdoms, and resembling the unequal amounts of difference that would be observable between the multiplied descendants of large and small families; and that the genealogical relationship between species and their subordinate varieties being a known fact, and that the relationship between species and the higher grades of classification being the same in kind, their nearness of consanguinity in proportion to their resemblance is implied,—that adaptive qualities, or those dependant on, and influenced by, habits of life, are not such as naturalists find most useful in classification; and this, Mr. Darwin says, is because they have been similarly influenced in unrelated families, instancing the community of habits and external appearance between the mouse and the shrew, the resemblance of the whale to a fish, and the external resemblance in the habits of unrelated genera of plants growing in similar situations,—and that it is a general rule that the less any part of the organisation is connected with special habits, the more important it becomes in classification, implying that there is a hidden bond of union between organisms, independently of the places they

hold (whether by special creation or otherwise) in the economy of nature; and this Mr. Darwin deduces is genealogical relationship. The distinction endeavoured to be defined between "special" and "adaptive" characters suggests the question as to where they are to be separated. Mr. Darwin carries us back to a time of indefinite organic simplicity, and by this theory of external influence all advances from it would, in the first instance, be by adaptive steps; and if there is any inherent difference between "special" and "adaptive," the one valuable as characterising a distinct genealogical line, and the other comparatively valueless, we have something to go by in trying to ascertain when the divergence of species, by means of adaptive modification, commenced. To what extent would Mr. Darwin use these "special" characters in classification? If they are really distinguishable from adaptive, to be used in a distinct sense for the purpose of classification, surely the characters of the organic prototypes, which cannot be obscured by the least taint of the adaptive character, ought to be sufficiently clear to save him from the vague speculations expressed in his concluding chapter, as to whether animals and plants have descended from, at most, four or five progenitors, or whether the two grand divisions have descended from a common prototype. What grounds has he for assuming that certain characters, selected for the purpose of classification, are *special*, when he tells us that every quality by which organic beings advanced from the simple prototypes was developed, by the impress of external circumstances, upon its possessor?

Morphology, or the unity of type in the construction of allied groups, or the resemblance to each other in the general plan of their organisation, though the functions of the homologous parts are dissimilar, is enlisted by Mr. Darwin in favour of his theory of genealogical relationship, and the modification of a part to suit various special purposes. At page 466 (third edition), he says:—"Nothing can be more hopeless than to explain this similarity of pattern in members of the same class by utility, or the doctrine of final causes; the hopelessness of the attempt has been expressly admitted by Owen, in his most interesting work on the nature of limbs. On the ordinary view of the independent creation of each being we can only say so it is—that it has so pleased the Creator to construct each animal and plant. The explanation is manifest on the theory of the natural selection of successive slight modifications, each modification being profitable, in some way or other, to the modified form."

There is a bearing of the fact of the correlation of plants which

must here be noticed. Let us exchange Mr. Darwin's term "correlation of growth" for "correlation of organization," and we think we attain to the means of accounting for such phenomena (as the uniformity of model in the construction of limbs in different vertebrate animals) as appear to Mr. Darwin to support his theory of genealogical affinity. Do we not find numberless instances of correlation of character when it cannot have depended upon blood relationships, such as associated characters of trifling importance running parallel in genera that are most distantly separated? Take, for instance, remarkable peculiarities of colour; as the tendency of a particular shade of blue, in a number of unrelated genera of plants, to vary with a peculiar and exactly uniform shade of pink flowers; and a peculiar reddish brown and yellow being associated in several unrelated genera, as *Calceolaria* and many of the *Leguminosæ*.

The relationship borne by one part of an organism to another part is a fact of wide application, for the works of God are all fairly and beautifully proportioned; and correlated properties (as relation in the form of the head to the form of the legs) are no more unaccountable, or inconsistent with special creation, than that an architect with an eye to beauty should make the different parts of his several buildings proportionate. If it exist in such trifling details as those just cited, where correlation of growth through genealogical affinity is out of the question, it is not unreasonable to suppose that the uniformity of model, upon which the more important parts are formed, is the result of special creation working out a consistent proportion of the integral parts.

If browns and yellows are consistent colours in unrelated genera of plants, and long heads and long limbs consistent in unrelated genera of animals, we may fairly carry the principle a step further, and say that the arrangement of bones forming a head is consistent with the arrangement of bones forming a limb. So that, on the bare fact of the correlation of parts, we ought to expect that the existence of a leg is consistent with the existence of a head, and all gradations of relation consistent, from this abstract fact down to those delicate relations between the proportions of these organs which Mr. Darwin notices; and the differences in a series of heads would imply a series of limbs separated by corresponding measures of difference, and apparently forming a related series, though really, in them, individual resemblances totally unconnected with each other. Again: unless all organic beings had been designed without any common resemblances, we must necessarily expect, on the principle of correlation of parts,

that any organic property, being common to several organisms, would involve community of character in some other parts; these, again, would involve other points of resemblance, and so on and on, till we get that exquisitely complex system of resemblances which co-exist within each organic kingdom.

The grounds upon which Mr. Darwin examines the phenomena of Embryology, as bearing on his theory, is the assumption that, at whatever age any variation would first appear in the parent, it would tend to reappear at a corresponding age in the offspring; and as a modification by external influences in the struggle for existence cannot take place in the foetal or early stages of life, he expects to find in the embryo and young animal an epitome of the being as it existed unmodified by external influences. He says that there is no valid reason in the economy of life why the foetus should not be developed with all the elaborations of the parent, but, assuming the existing organic beings have multiplied and diverged in character from simpler types, he sees in the simplicity of the foetus a resemblance to those simpler types. He expects to find in it the absence of characters which have since specialized the improved forms to particular spheres of existence, and the existence perhaps of a few characters, which would be obliterated by disuse, in the multiplied descendants, occupying individually more limited functions. Here and there it is expected that the foetus will reveal bonds of old relationship, which in the adult have been obliterated by the development of characters distinguishing more special functions, *e. g.*, the occasional appearance of faint bars and shoulder stripes in the foal of the horse and of the ass reveal, he says, their common origin with the zebra, and the much closer resemblance of the spotted young of the blackbird and ouzel to the thrush than when matured implies modern divergence in character from some ancient common progenitor; again, that the faint bars noticeable in the young cub of the lion point to its community of descent with the tiger and cat, the more individual characters of the genera intensified on maturity having been produced by the divided progeny of some older type filling more special places in the circle of organic life. In animals, as the horse, dog and pigeon, where the breeds are very various, the differences characterising them are less strikingly developed in the young animal than the adult, pointing, on the principle before mentioned, to the nearer resemblance of the parents before they had assumed the fully-developed characters of their respective breeds. Mr. Darwin says, at page 438 (first edition):—"The embryo of distinct animals within the same class are often strikingly similar; a better

proof of this cannot be given than a circumstance mentioned by Agassiz, namely, that having forgotten to ticket the embryo of some vertebrate animal, he cannot now tell whether it be that of a mammal, bird or reptile. The vermiform larvæ of moths, flies, beetles, &c., resemble each other much more closely than do the mature insects. We occasionally, though rarely, see something of this kind in plants; thus the embryonic leaves of *Ulex* or furze, and the first leaves of the Phyllodineous Acacias, are pinnate, or divided like the ordinary leaves of the Leguminosæ.

Mr. Darwin looks upon rudimentary or functionless members as either retrospectively or progressively implying progress,—little pages in the history of individual species, parallel with the phenomena of the extinction and first development of individuals as members of groups. Some rudimentary organs are those that have become functionless by disuse, and others may be the elementary stages of future developments not yet entered upon their allotted functions; otherwise it would be impossible to account for their existence as the result of natural selection taking at advantage of *profitable* variations. At page 488 (third edition) Mr. Darwin says:—“Rudimentary organs may be compared with the letters of a word still retained in the spelling but become useless in the pronunciation, but which serve as a clew in seeking for its derivation. On the view of descent with modification, we may conclude that the existence of organs in a rudimentary, imperfect and useless condition, or quite absorbed, far from presenting a strange difficulty, as they assuredly do on the ordinary doctrine of creation, might even have been anticipated, and can be accounted for by the laws of inheritance.” At page 452:—“The wing of the penguin is of high service and acts as a fin, and may therefore represent the nascent state of the wings of birds; not that I believe this to be the case; it is more probably a reduced organ modified by a new function. The wing of the Apteryx is useless, and is truly rudimentary. The mammary gland of the *Ornithorhynchus* may perhaps be considered, in comparison with the udder of a cow, as in a nascent state.” At page 453:—“It is an important fact that rudimentary organs, as teeth in the upper jaws of whales and ruminants, can often be detected in the embryo, but afterwards wholly disappear. It is also, I believe, of universal rule that a rudimentary part or organ is of greater size, relatively to the adjoining part of the embryo, than in the adult; so that the organ in its early stage is less rudimentary, or even cannot be said to be in any degree rudimentary.” Bearing in mind Mr. Darwin’s theory, that the embryo is a sort of epitome of the

animal's ancestors, would point to a former more perfect condition of the now absorbed organ.

The next class of evidence Mr. Darwin dwells upon relates to the assumed processes of change by which the conditions we see around us have been brought about. The progress of change in species, under a state of nature, in relation to our idea of time, having been, on Mr. Darwin's theory, so infinitely slow, he says we must not expect it to be appreciable by our observation; it rests, therefore, rather on implied than historical evidence. In Chapter I. he fills up the gap with a catalogue of facts bearing on the actual progress of variation observed under domestication. Here we have not only the result, but, knowing in most cases the condition of the originals of our domestic productions, their state under domestication gives us a positive evidence of a certain amount of change. A kind of artificially-produced plasticity of character, of both animals and plants that have been domesticated, must be admitted; but whether this, which is certainly proportionate to the artificial circumstances, has any relation to "variation under nature," seems scarcely implied. Mr. Darwin tells us that seedlings from the same fruit, and young of the same litter, sometimes differ considerably from each other, though the young and the parents have apparently been exposed to the same conditions of life; that the change of habit, under domestication, may influence the relative proportions of the body, *e. g.*, "I find in the domestic duck that the bones of the wing weigh less, and the bones of the leg more, in proportion to the whole skeleton, than do the bones of the wild duck; and I presume that this change may be safely attributed to the domestic duck walking more and flying less than its wild parent;" that the artificially-produced variation of one part of an animal is frequently accompanied by a change in another part not directly influenced, on a principle Mr. Darwin calls correlation of growth, or relation in the characters of isolated members, *e. g.*, "breeders believe that long limbs are almost always accompanied by an elongated head; pigeons with short beaks have small feet, and those with long beaks long feet; hairless dogs have imperfect teeth; long-haired and coarse-haired animals, long or many horns," implying that the impress of circumstances upon a particular function may also involve the modification of other parts of the individual. The extent of the fact of variation under domestication receives a strong illustration in the widely-different breeds of most of our domestic animals and plants, which are supposed to have descended from single wild stocks; and Mr. Darwin says that it illustrates a similar principle he

believes to be at work under a state of nature, the prime mover of which is the struggle for existence treated of in Chapter III, on the reproductive powers being in excess of the necessities for keeping up animal and vegetable population, involving the destruction of a large proportion of the individuals that are brought into existence. In illustration of this Mr. Darwin says, at page 67 (third edition):—

“There is no exception to the rule that every organic being naturally increases at so high a rate that, if not destroyed, the earth would soon be peopled by the progeny of a single pair. Even slow-breeding man has doubled in twenty-five years, and at this rate in a few thousand years there would literally not be standing room for his progeny. Linneus has calculated that if an annual plant produced only two seeds—and there is no plant so unproductive as this—and their seedlings next year produced two seeds, and so on, in thirty years there would be a million plants. The elephant is reckoned the slowest breeder of all known animals, and I have taken some pains to calculate its probable *minimum* rate of natural increase; it would be under the mark to assume that it breeds when thirty years old, and goes on breeding till ninety years old, bringing forth three pairs of young in this interval. If this be so at the end of the fifth century, there would be alive fifteen millions of elephants, descended from the first pair.” Mr. Darwin asks,—Then who is to die and who is to live of this excessive progeny? Nature replies,—If they differ, the weakest must give way. Mr. Darwin says, on the principle of “variation under nature” they do differ; some are a little worse and some a little better than their parents; and that the weakest must die, and the strongest and best live and become the parents of the next generation, which inherits not only the advantageous quality by which its parents obtained the mastery, but an increased measure of that advantage, for the descendants not only inherit the quality of the variation, but also the property of variability, and so on and on, till this particular quality becomes intensified, and the property of a numerous race, who, as soon as they become too numerous for their particular sphere, again split up on some little advantageous variations, which in their turn become the characteristic properties of each section of the divided race. The first thoughts that this theory of the production of species by these infinitely small steps of variation suggest are,—How is it that we get any individuality in the character of species? and how is it that species do not merge into each other by almost insensible gradations? If this property of variability is an inherent principle, and may be not merely an occasional accident, but the property, in

different measure, of any individual, how is it that every organic individual around us does not bear the impress of the process of change, and repudiate specific clanship? To account for this Mr. Darwin introduces several principles — “the struggle for existence,” just referred to; “variation under nature;” “natural selection;” “extinction;” “divergence of character;” and “correlation of growth.” These are all treated of under several distinct heads, but they appear so intimately connected that in the following short summary we must consider them together. First, then, the struggle for existence is the generation of a greater number of individuals than can be supported; and this, again, is parallel with the production of a greater number of species than the divided functions of nature are ordained for. Then comes the assumed fact of variation under nature, deduced from the evidence of variation under domestication. Variation under nature is primarily the slight difference of individuals, parallel also with the slight difference of sets of individuals. Slight differences involving slight advantages in the struggle for existence, some must give way; these advantages, however infinitely slight, turn the scale in favour of the possessors. Then follows extinction on the death of the weaker individuals, and parallel with it also, in a variety of grades, the extinction of sets of individuals, or specific groups, by stronger sets of individuals encroaching upon them. Divergence of character, or the production of individuality in species, results in the struggle for existence taking place, as it were in separate little groups, by the most closely related individuals striving for an identical part of the sphere of nature; and as the individuals having the character suiting them for that sphere most strongly developed would obviously gain the mastery, the less characteristic individuals of each little group of competition will be extinguished, and the conquerors consequently be placed in a more isolated position. Then, the different groups will perhaps vary in their power of reproduction and persistency, and as they extend will encroach upon and compete with each other, some becoming extinguished, and others of stronger power will thus become still further isolated, and, again dividing and subdividing by newly-developed grades of character, fill a disproportionate share of the arena of nature; and thus Mr. Darwin accounts for the apparent want of symmetry in the measures of difference separating genera and species.

The theory is certainly very plausible, and presents an easy means of accounting for the irregular grades of difference observable in the organic series. The general completeness of the series, and the apparently irregular gaps that here and there occur, impress the mind

with the idea of imperfection, and imperfection is not compatible with our notions of creation as delivered from the hands of the Creator.

Without at all agreeing with Mr. Darwin, we would suggest that the history of man upon the earth seems to be parallel with what he supposes has gone before us, race struggling with race, some getting the mastery, the stronger extinguishing the weaker; then, culminating, and perhaps becoming unwieldy by their size, and trying to include too great a diversity of compounds, break up into distinct nations, isolated from each other by some peculiar character (as instanced in the recent severance of the United States) which, though of advantage to them separately, was incompatible in association. Each of the young nations, at first, fill different spheres; increase, multiply; and as they may be of unequal strength, the more powerful outrun the others; the weakest are wholly extinguished, and those of middle power, too weak to multiply and too strong to die, go dwindling on from age to age as feeble communities, bringing down to posterity antiquated characters which have been quite lost in the subdivisions of the more vigorous races into "modern nations," but to be wholly cut off only when the dominant races take unusual strides in advance of them. Every step in these changes would tend to some kind of improvement, as no new quality could become dominant that did not confer some advantage on its possessor; the feeble and small-numbered races of the world, termed aboriginal, would bear a sort of analogy to those brute genera, as the *Ornithorhynchus*, *Apteryx*, *Dodo*, &c., which have become or are becoming extinct; and a parallelism might even be drawn between the monumental remains of extinct nations and the fossilized ancestors (if such they be) of organic life.

Now, it must be admitted that there are many striking points of resemblance between these facts and what Mr. Darwin says he has observed in the past history of organic life; but we can scarcely admit that the parallel resemblance is the result of genealogical affinity between the brute creation and the human species; and if a special creation is admitted for man, with his many points of sympathy with the laws of lower organic life, the probability of special creation lower in the scale of nature is at once admitted. However slightly Mr. Darwin may speak of "plans of creation" we do see general parallelisms and a sympathy of design running through the whole system of creation, not only between the different divisions of organic nature, but in things which are necessarily disconnected; and we ask whether the resemblances occurring within the organic kingdoms may not be attributable to this same uniformity of design rather than genealogical

relationship. Classification, or the subordination of group to group, is a general and vastly-extensive natural law. There is not a single principle in organic classification that Mr. Darwin enlists as favourable to his theory that is not strikingly paralleled in some unrelated part of creation; for instance, the analogy between the system of arrangement of the heavenly bodies,—satellites grouped round planets, planets round the suns, and, again, suns or stars round some common centre into nebulous groups,—and that subordination of group to group, in organic classification, which he attributes to blood relationship.

Then, again, the unequal amounts of differences separating species, which Mr. Darwin attributes to the secondary cause of extinction, is most strikingly paralleled in the mineral kingdom, where such a process could not take place; here we have group subordinate to group, and the unequal amount of difference between different groups and the individuals of different groups, just as in the organic kingdoms; indeed, if Mr. Darwin could believe he was dealing with plants or animals instead of inactive mineral elements, he could weave them into a genealogical series more remarkably consistent than the blood affinities he assumes exist in the organic kingdoms, not merely by arbitrary measures of resemblance, but, as every chemist knows, by the most complex and exquisitely perfect series of correlated affinities. With reference to inorganic classification, and the unequal amounts of difference distinguishing the sixty or seventy elements, the grouping together of the alkalis is most striking. If they were plants or animals Mr. Darwin would surely say that they were very recently descended from some common parent, and that they ought not to be ranked higher than varieties; and if the extremes of dissimilarity in the elements were linked together by the same slight amounts of difference, it would require several thousand individuals to perfect the series. Again: arsenic and antimony are associated by an extraordinary number of common properties, and, as compared with these close affinities, there are, as in the organic kingdoms, isolated individuals—as carbon, nitrogen and silex—which might be aptly compared to the *Ornithorhynchus* and *Apteryx* of the organic series. Then, again, there are little *groups* of elements, as that including iodine, bromine, chlorine and fluorine, with their individuals closely related, but collectively isolated in character from the other elements and other groups, as the alkalis, alkaline earths and true earths, which are more easily associated into a related series. There are also kinds of resemblances which may be compared to collateral relationship, as between the heavy and the light metals in the affinities of baryum to

lead. The metals can also be subdivided into a number of natural groups, defined by correlated affinities, as that including the metals resembling platina, and the group of metals having oxides with acid properties; in fact, the affinities and relationships of all the elements are endless, and to outward resemblance they possess more common blood than either of the organic kingdoms. There is another unconnected parallelism which must here be noticed, the resemblance in the kinds of properties existing within the two organic kingdoms. Mr. Darwin may perhaps attribute them to genealogical relationship, as he claims the possibility of the common origin of animals and vegetables; but it would be obviously necessary, on his theory, that any organs or functions, common to the two kingdoms through affinity, should have been developed by the process of natural selection before their divergence. One of the many common properties shared by the two kingdoms is that wonderful and mysterious phenomenon, sexuality. Now all naturalists, even those that assume their community in their lowest forms, admit that the animal and vegetable kingdoms diverge long before the sexual element appears; that is, that a large series of plants and animals, far above the stage in which the animal and vegetable kingdoms are possibly identical, are asexual; so that, even admitting, for the sake of argument, that plants and animals have gradually progressed from a common origin, sexuality in plants and sexuality in animals are genealogically independent, and affords another striking example of unrelated analogy. A somewhat similar case presents itself in the abortive teat in the male mammal; here is an organ utterly functionless, and if it is not an aborted once useful organ it cannot have been developed by natural selection; it cannot be an aborted organ resulting from the separation of the sexes, because sexuality, or the distinction between male and female, appears much lower in the scale of creation than the teat-bearing mammal, and the teat, as an organ of nutrition concomitant with parturition, would, on the principle of natural selection, have been perfected in the one sex only.

Mr. Darwin refers to an apparent difficulty somewhat parallel with the above, and we notice it to show how easily we may be misled in assuming certain points of organization as the gradual effects of use for particular purposes. We refer to the composition of the skull out of *distinct bones*, apparently for the purpose of its temporary contraction in parturition. Such may be the case, but not as the result of gradual modification by use; for we find them represented by corresponding marks, when the growth of bone takes place, in

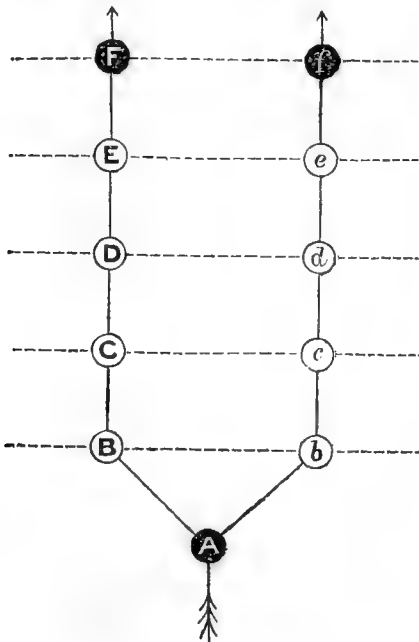
the skulls of oviparous Vertebrata, the elasticity of the skulls of which would be objectless; and in them it cannot have been the inherited evidence of an aborted function previously matured, by natural selection, in a viviparous race, which, being higher in the scale of organization, on the theory of natural progression would be developed from and subsequently to the oviparous. They must, then, clearly be considered as one of the numerous examples of unrelated resemblances and "unity of type," upon which we are led to doubt that common resemblances are dependant on genealogical relationships. A great difficulty, in attributing progress of organization as the result of the gradual modification and advancement of organs, through certain slight variations giving their possessors advantages over their fellows, exists in the fact that small measures of improvement of many organs, or anything short of their immediate perfection, would confer no advantages on their possessors. How, for example, could mammiferous nutrition have been perfected by short stages? The young mammal requires a certain amount of nourishment for its existence, and it is obvious it could not live during the imperfected stages of the organs of supply; so that, however rapid the strides of improvement might be, the extinction of the improved progeny would at once prevent the results of the improvements being accumulated and realized; and it is impossible to fancy a process of generation intermediate between the oviparous and viviparous, to account for the gradual adaptation of the young to suit the gradual perfection of the milk-producing organs.

In the competitive struggle for existence individuals having the greatest natural stamina, and the usually accompanying reproductive energy, would certainly have the advantage; and would not these qualities compete with and extinguish all other deviations from the normal condition? Now, as a general rule, we think it must be assumed that no marked deviation from the normal standard takes place without some sacrifice of reproductive energy, either in animals or plants; and, parallel with this, the strongest individuals have always the characteristic points of the genus or species most strongly developed; for instance, who would think of taking a small and weakly specimen—the leaf of a young seedling, or the first-developed small frond of a fern—to describe the characteristic features of the species from? Have we not, therefore, on this principle, a natural provision for perpetuating the individuality of species, by giving the most normal individuals the advantage in the struggle for existence?

Artificial variations from the normal type, as domestic varieties, have generally less stamina and power of persistence than their native parent; for example, the most artificial forms of florists' flowers, or those that are most "highly bred" (independently of the question of sterile double flowers, through the abortion of the reproductive organs), produce less seed, and are altogether more difficult to propagate, than the less artificial varieties. This is especially evident to the cultivators of the fancy varieties of the scarlet *Pelargonium*; the "golden chain," "flower of the day," "Alma," and other highly-bred fancy varieties being much less easy to strike and keep alive than the common scarlet, more closely resembling the original species. Again: breeders of stock know how frequently their efforts to produce certain artificial qualities are frustrated by the individuals leading to them ceasing to breed. If this holds good with variations under nature — and the two, according to Mr. Darwin, are parallel, for he illustrates variation under nature by facts of variation under domestication—the tendency must certainly be to the perpetuation of the species in its most normal descendants; and a principle is established that variations, as a rule, do not tend to the well-being of the possessors, or give them any advantage in the struggle for existence. The fact has a variety of bearings: take, for example, the case of the colour of certain animals resembling the colour of their habitats, which most naturalists agree is a provision to guard them from the too easy assaults of their predatory neighbours; any deviation from the normal colour — as a little lighter or a little darker tint, or the presence even of a white feather — would surely mark them as the first to be assailed by animals of prey, and tend to perpetuate the dominion of the usual colour of fur or plumage.

The greatest difficulty we see in Mr. Darwin's theory is the disposal of the infinite number of intermediate forms which must necessarily be the result of the production of species by small steps of variation; it must be by some absolute law, for those cases in which a want of definition between species occur are so few that they at once present themselves to us as exceptional, and we must look for an almost universally pervading operation tending to the extinction of intermediate forms. Mr. Darwin tells us that not only the variation but the property of variation is inherited, and if this be true why should it be set in motion through a number of generations sufficient to accumulate the amount of difference dividing species and then utterly cease? It commences with an individual variation, is prolonged by means of slight individual variations, every individual partaking of the property

in some measure; then, without the slightest reason, stands still, and is not prolonged in the slightest degree through succeeding descendants; otherwise there would be the perpetual obliteration of species going on before us, through the deviation of every individual and its descendants, in every variety of measure, from the original type. We cannot assume even that the correspondence in character of cotemporary individuals is the result of absolutely parallel amounts of the same kind of variation going on in distinct lines of descent, for as its result is accumulatory, and the original type might be throwing off variations through a length of time, the different ages at which we should view the evenly varying descendants would present different measures of the ever accumulating variation and an apparent difference in the cotemporary descendants, according to their antiquity; on the other hand, if the principle of variation was inherited unequally, the infinitely complex variety in the kinds and measures of difference that must result in the descendants would be utterly inconsistent with the amount of individuality existing in species. The process of extinction by which Mr. Darwin gets rid of these infinite series of intermediate forms must depend not in their possessing any abstract quality of being intermediate, but in standing at a disadvantage in reproductive and constitutional energy. The question at once presents itself to us, Has this, even on Mr. Darwin's theory, invariably been correlated with the differences in measure of the characters separating species, or, in



other words, has every variation of structure or habit been connected with relative power of dominion over the form from which it has been derived?— for the assumed fact of variations tending to specific characters, *conferring a dominant advantage over their inferior ancestors*, is the very essence of the argument.

Referring to the annexed diagram, let F and f represent two species, and B, C, D and E, and b, c, d and e the extinct steps of variation that have led to them from some common parent, A, or the two

intermediate lines of species that have become extinct now on the theory of advancement. It is somewhat plausible to assume that the less useful ancestral forms have, in a regular progressive series, been replaced by their improved progeny, A by B, B by C, C by D, D by E, and E by F; but supposing we find the ancestor A, or its unaltered descendants, still existing by the side of F and *f*,—and this is a case abundantly and variously illustrated by the cotemporary existence of organic beings of different degrees of organization,—we must assume, first, that B had not a dominant advantage over A, or it would have extinguished A, and yet that it could bequeath to C a dominant advantage over itself, parallel with the improved variation, which it did not inherit with its own improved variation from A; and, again, as we progress upwards towards D and E, that the little steps of advantage accompanying the little steps of variation could individually effect the extermination of the successive steps of variation without, in any measure of their accumulation or divergence, summing up an advantage over A. Then here we clearly establish the fact that dominant advantage, or power of success in the struggle for existence, has not an exact relation to other variations; for instance, that those differences of structure upon which genera and species are based might go on accumulating without that condition so absolutely essential to Mr. Darwin's argument, that their power of dominion is correspondingly increased; nay, some of the earlier forms may even retain, as in the case of A, a slight measure of dominant advantage over its otherwise advanced progeny; for we cannot reflect on the coexistence of organisms of different height in the scale of nature without being convinced of the fact, however securely those low in the scale may have been saved by divergence of character from extinction in recent competition with the higher, that there was a time at which they must, on the theory of progression, have conquered forms genealogically and structurally in advance of them, for they have outlived every gradation of the assumed links connecting them with higher organizations.

It is difficult for the mind to picture the infinitely varied result of Mr. Darwin's theory in the non-coincident operation of variation in structure, and variation in power of dominion, as it must of necessity involve every variety of gradation of character between organisms; but in viewing the question as a matter of experience we do not see this, nor a measure of it sufficient to account for the gradual mutation of species.

It is impossible, also, to imagine that such slight differences of dominant power as must of necessity separate the slight steps of

variation could influence any appreciable advantage in the struggle for existence. Do we not see every grade of specific difference filling its special place, and varieties, species and genera, of every variety of difference, associating their individuals, and yet all live and multiply? Those varieties which are obviously varieties and separated by the smallest measures of difference, and would, therefore, Mr. Darwin tells us, be involved in the closest competition, are generally found associated with their nearly allied species of identical habits, as many of the closely resembling *Veronicas*. *Linaria spuria* and *L. Elatine*, which are perhaps more closely resembling each other than any two other species of the genus, occur more frequently together than separately; and again, different genera, of largely different character and power of persistence and reproduction, are closely associated without engaging in that mutually extirpating struggle upon which Mr. Darwin's theory of progression so much depends. How very few plants can be said to occupy the ground so densely (as in a dense agricultural crop), through a great reproductive power, as, by their close proximity, to limit their further extension! and, moreover, when mutual extirpation does take place, it is in the earliest stages of development, before the individuals could be subjected to those mutually acting modifications of character which Mr. Darwin says have been the steps leading to specific differences. Again: in the animal kingdom many parts of the globe seem insufficiently stocked, or, in other words, the vegetation would easily support a more extensive herbivorous life, which would afford food and the consequent power of increase and extended dominion to carnivorous races. Take, for example, the prairies of S. America, where the great bulk of vegetation suitable for the support of herbivorous life year after year decays; now the animals that are sustained by it can scarcely be said to be competing with each other for the means of subsistence, for we see in the rapid increase of the domestic horse, introduced in the sixteenth century by the Spaniards, that the inherent power of the prairies in supporting animal life was not nearly made available by its native inhabitants; so that, there at least, we ought to find, in full life, those intermediate grades which Mr. Darwin tells us are extirpated where the means of support are limited. Assuming even that the power of stamina, reproduction and persistency is exactly correlated with all these differences constituting species, it is impossible to realize that such infinitely small points of advantage accompanying the infinitely small steps of variation can, in their separate power, have any influence in Mr. Darwin's 'Battle of Life;' we instinctively feel that each would live and find

a suitable place in the circle of creation, as the human family forms in the social scale an infinity of indefinable grades, each unmolested by its neighbour.

← The influence that the wide dispersal of the individuals of a species would have in counteracting the effect of competition and extinction, in weeding out the continual production of intermediate forms, is another point that should be considered with reference to Mr. Darwin's argument in explanation of the individuality of species. Competition can only take place between the individuals of a species where there is actual association. In the case of animals the regions of competition will be wide in proportion to their means of ranging, and the theory might hold good to a practical extent, for as the weaker individuals were being reduced by improved variations there would be no difficulty in supposing that the stronger could soon occupy by migration the whole geographical range of the species, and thus quite outstrip their inferior progenitors. But with plants this uniform interchanging competition could not take place, because there is not continual intermigration. Suppose, for example, the case of any common plant distributed throughout the whole of England or Europe, as *Athyrium Filix-fœmina*, and admit in all its fulness Mr. Darwin's theory of variation, that the *Athyrium* is continually throwing off slightly varying descendants, and that the improved forms are supplanting their inferior progenitors. Now there must be some limit to the range within which these circles of competition take place, for no one would be bold enough to say that the different grades of variation of a species growing in Devonshire are competing with the different grades of variation of the same species growing in Norfolk, or, taking a larger view, that the individuals growing in Spain are competing with those growing in Russia; indeed, not only is there every grade of variation, but there must be every gradation in competition, proportionate to geographical severance, and we ought certainly to find every gradation of result and the very process of the individualization of species thereby neutralized; for instance, supposing an improved variation is thrown off in Norfolk, the individuals in Devonshire would be none the worse for this, unless the improved form could exterminate its normal progenitor where it originated, and gradually spread to Devonshire; another variation may be thrown off in Devonshire, and retained within a distinct range of competition to the Norfolk district, and thus several forms might be preserved from extinction, for unless every improved step of variation could extend itself *over the whole geographical range of the*

species, it is obvious that the consecutive extinction of the whole of the individuals of every step of variation could not take place.

Great and more important variations will have a more extensive power of dominion than smaller variations, therefore their range and circle of competition will be more extensive. Small variations will have a small proportion of power over their progenitors, and a correspondingly small power of ranging, which will thus tend to their isolation and preserve them from competition involving their extinction, for, as the measures of improved variations are arbitrary, it is quite probable that many might have just enough power to keep themselves ahead of their progenitors and preserve themselves from extinction by them, without having a great power of spreading; indeed, as Mr. Darwin's steps of variation under nature are so infinitely small, so small as to be undiscernible in their separate amount, it is most probable that this nice balance would be preserved, and thus the slightest gradations of difference be perpetuated.

It is impossible to deny the infinite variety in the grades of variation, or the infinite variety in the grades of competition, resulting from the operation of Mr. Darwin's theory; and these, being as it were multiplied into each other, would, even admitting the operation of "extinction," produce a complexity of result utterly inconsistent with the amount of individuality observable in species.

The difficulties of the theory that have presented themselves to Mr. Darwin, and their attempted explanation, are treated of in Chapters VI., VII., VIII. and IX., and part of Chapters XI. and XII. The most prominent obstacle that strikes him is that which we have already referred to, *viz.*, the absence of the intermediate links representing the gradations of variation by which specific differences have been produced, which he accounts for by the extinction of the consecutive forms being concurrent with the production of each fresh grade of improvement: he says that there would be no great production of individuals separated by small measures of difference and advantage, and that it would not be until each specific difference had been accumulated into a decided advantage upon some point that it would become decidedly dominant; thus it is that the individuals of varieties are generally fewer and have a more restricted range than those of species. Species, if we understand Mr. Darwin aright, are stages in the process of variation where it has so far accumulated as to give the possessors a sort of dominant era in the struggle for existence. The imperfection of the geological record, our imperfect acquaintance with that record, and the fewness of the individuals of the intermediate links compared

with those of the perfected species, are the causes assigned for the absence of geological evidence of the gradation of one specific form into a higher.

Another difficulty cited by Mr. Darwin is the existence in a particular group of species adapted to fill places in the economy of nature, for which the group in its entirety was not designed; for instance, the adaptation of the bat for flight, though its nearest allies have all terrestrial habits, and the aquatic Carnivoræ, structurally allied to animals of totally distinct habits, present difficulties in the way of community of descent, because of the apparent impossibility of the existence of the animal in an intermediate state, and of the improbability of natural selection leading to characters and habits inconsistent with those habits which have tended to the well-being of the group. Mr. Darwin meets the difficulty by citing sundry cases of species possessing extended diversity of habits and small measures of organic modification to suit those habits,—of animals of structures apparently adapted to particular habits filling a distinct position in the economy of nature; for instance, a species of woodpecker, which is obviously adapted by its character for climbing trees and licking out insects with its long tongue from the crevices of the bark, existing in the treeless American prairies,—of the *Musula vison* of North America, which has webbed feet, and resembles the otter in its fur, short legs and long tail, which in summer preys on fish, but during the frozen winter preys like other polecats or mice and other land animals,—of the family of squirrels, with every intermediate grade of character, from a merely flattened tail to the flying squirrels, having their tail and limbs united by a broad expanse of membrane,—of a flying Lemur, with such a fully developed similar membrane, as to have been at one time mistaken for a bat,—of the loggerheaded duck, whose wings do not fulfil the ordinary functions, but are used as propelling fins in the water, and as a kind of front legs on the land,—of the grebes with feet intermediate in character between the normal type of webbed feet and the feet of land birds,—of the ostrich, whose wings are only used as sails,—and of the Apteryx, where the wings are utterly functionless; all which instances are looked upon by Mr. Darwin as incipient stages that might ultimately be developed into those greater differences of habit and “adaptive” structure which so widely divide some organic classes without disassociating them as natural groups.

The difficulty of attributing the formation of organs of no apparent influence in the well-being of its possessors, as the result of natural selection, affects the question doubly; first, there would be no apparent

inducement for their preservation and development ; and, secondly, supposing they might have a small proportionate influence in the course of natural selection,—that a line of development following the formation of any more important organ would certainly obliterate it. These objections Mr. Darwin meets by assuming that many functionless organs may be either members in an incipient state of formation, not yet fulfilling their allotted functions, or those that have passed out of use and become aborted, and also as there is an evident relation in the development of distinct parts of an organic structure (as in the proportion of head to limbs before instanced) that the modification and formation of some useful organ, by the active process of natural selection, may, on the principle of correlation of growth, influence a parallel but functionless development of some other part.

The limited evidence of the formation of organs of great complexity, as the eye, by natural selection, from parallel organs of simpler and scarcely related structure, is another difficulty ; but although the graduated series of links connecting them is incomplete, Mr. Darwin says that the possibility of its entire completeness is implied by the existence of little isolated parts of the complete series gradating upwards in almost every point in the scale of animal organization ; that the principle of extinction is accountable for the breaks in the series, and, as soft organs cannot be preserved in a fossilized state, that the geological eras might otherwise afford evidence of more complete gradations.

Highly remarkable special organs of unusual character, being common to two widely distinct genera—for instance, a peculiar arrangement of the pollen-grains, similar in *Orchis* and *Asclepias*—would throw doubt on community of structure being necessarily the result of blood relationship ; but Mr. Darwin considers such cases as attributable to natural selection working, in distinct courses towards a similar result, for the good of the possessors, “in the same way as two men have independently hit on the very same invention.”

As a means of accounting for the formation of some complex organs by the process of natural selection, Mr. Darwin supposes the possibility of the transition of functions, *i. e.*, that an organ may be developed to a certain stage for a particular function, then perform some supplementary function which may for a time accompany the normal function, and, by gradual use, ultimately become the dominant and only function, the use for which the organ in its early stage was constructed being entirely obliterated. At page 210 (third edition), Mr. Darwin says :—
“ The illustration of the swim-bladder in fishes is a good one, because

it shows us clearly the highly important fact that an organ originally constructed for one purpose, namely, flotation, may be converted into one for a wholly different use, namely, respiration; the swim-bladder has also been worked as an accessory to the auditory organs of certain fish, or, for I do not know which view is now generally held, a part of the auditory apparatus has been worked in as a complement to the swim-bladder. All physiologists admit that the swim-bladder is homologous or ideally similar in position and structure with the lungs of the higher vertebrate animals; hence there seems to be no extreme difficulty in believing that natural selection has actually converted a swim-bladder into a lung or organ used exclusively for respiration." This explanation, however necessary, implies, in the early stage of the process, the multiplication of functions in a particular part, which is diametrically opposed to the theory of advance and complexity of structure being the result of natural selection by the specialization of particular functions to particular organs. It is in the more lowly organized beings that we find a multiplication of functions condensed on a single organ, and a retrogressive process seems to be implied when more functions are applied to an organ than those for which it was designed.

Another difficulty Mr. Darwin discusses is that presented by the apparent fact of certain organs having been ordained in relation to other organic beings, implying sympathy of design; for instance, the stings of venomous animals as a means of defence. The production of the sting of the bee by natural selection presents a further difficulty, because its exercise involves the death of its possessor, for as its production can therefore confer no dominant advantage upon its owner we should be inclined to view it as a preordained function in relation to the species assailed by it. At page 221 (third edition) Mr. Darwin says:—"Natural selection will never produce in a being anything injurious to itself, for natural selection acts solely by and for the good of each. No organ will be formed, as Paley has remarked, for the purpose of causing pain or for doing an injury to its possessor. If a fair balance be struck between the good and the evil caused by each part, each will be found on the whole advantageous; after the lapse of time, under changing conditions of life, if any part comes to be injurious it will be modified, or if it be not so the being will become extinct, as myriads have become extinct."

The subject of instinct, treated of in Chapter VII., is discussed as a difficulty, for it is not easy to imagine how those qualities which have such a kindred resemblance to mental power and reflection can have

been developed and improved by processes which are assumed as the means of organic modification. Mr. Darwin appears to look upon instinct as parallel with any other quality essential to the existence of the possessor, and like any mere physical advantage has been gradually developed by the process of natural selection. Referring to the instincts of the honey bee, the individual which would construct its cells of the greatest capacity, with the least amount of material, would have an advantage over its fellows in storing honey for the winter, and the power of manufacturing the beautifully perfected hexagonal construction might therefore be gradually developed by the accumulated inheritance of that half-mental experience we call instinct, through those individuals that have become dominant from attaining to the most perfect economy in the construction of the comb. If we look upon instinct as merely the inherited experience of bygone generations it may perhaps be admitted into the same category as the more strictly physical qualities, which Mr. Darwin tells us have been developed by natural selection; he even enlists the existence of some instincts as favourable to his theory, and says that those common to the widely isolated species of the same genera distinctly point to genealogical affinity.

Another grave difficulty in the way of the theory of natural selection occurs in the fact of the production, by some insects, of neuter, sterile casts, or particular groups of isolated individuals, distinct in structure and habits from the ordinary line of generation. It seems almost impossible that these can have been produced by gradual modification, because they leave no inheritance to gradually accumulate the deviation from the generating line, and, furthermore, the whole amount of difference is accumulated in a single generation, but Mr. Darwin says, on the assumption that these sterile casts are of advantage to the social economy of the species, the individuals tending to produce them would become dominant and gradually accumulate the property of generating the completely sterile neuter casts.

The alleged fact of the fertility of the hybrids produced by the crossing of varieties, and the sterility of those produced by the crossing of species, would imply two serious difficulties; first, an essential difference between varieties and species, which Mr. Darwin says is one only of measure; and secondly, a natural provision for the maintenance of the individuality of species. Chapter VIII., on the subject of hybridism, is principally devoted to questioning the force of the evidence that has been adduced in favour of an absolute difference between the fertility of the offspring of crossed varieties and crossed

species ; Mr. Darwin admits the fact as one of measure, accountable, he says, from those organic forms classified as varieties having closer affinity than those distinguished as species. The evidence he disputes, he says, is full of anomalies and difficulties, and has a false amount of weight given it from the fact of the reputed phenomenon having been erroneously used to define what forms are to be called species and what varieties. The production of fertile offspring from two distinct forms, whether they be species or varieties, is exceedingly arbitrary : in some genera individuals widely differing can be crossed to produce fertile progeny ; in others the forms more closely resembling each other produce perfectly sterile progeny. The species or varieties of some genera are more easy to get first crosses from than others ; and yet the progeny are less fertile than from those which are more difficult to obtain as first crosses. Again : the ease with which first crosses may be obtained between two species depends on which is employed as the male and which the female ; or, in other words, two species do not always produce reciprocal crosses with equal facility ; *e. g.*, the male of A and female of B may more readily breed and produce fertile progeny than the male of B and female of A. There are some species that are more easily fertilized by the pollen of another and distinct species than by their own pollen. Looking at all these anomalous facts, and the great difficulty with which they beset the subject of hybridism, Mr. Darwin does not consider that the balance of evidence in favour of the increased fertility of the offspring of crossed varieties over those of crossed species is greater than can be justly accounted for by the closer organic resemblance between varieties than between species. We know that there is some limit to the diversity of organic forms that will produce fertile progeny, and we are justified in expecting to find the measure of sterility proportionate to the measure of difference.

The last difficulty Mr. Darwin discusses (Chapter XI.) is the fact of certain apparent exceptions to the very general law, so essential to his theory, that the area inhabited by a species is continuous ; for if the same species occupied isolated parts of the world, between which migration was impracticable, we should be driven to the inevitable alternative, either that they were derived from distinct centres of creation, or “ the improbable assumption that species identically the same had been derived, by the process of natural selection, from parents specifically distinct.”

The most prominent examples of isolation are of alpine species being common to the summits of mountain ranges widely separated

by extensive temperate and tropical lowlands, across which the migration of cold-loving species could not, under ordinary circumstances, take place; the wide distribution of fresh-water animal and vegetable species occurring at distant stations separated by impassable barriers of land, and the occurrence of terrestrial species common to islands and mainlands separated by hundreds of miles of open sea acting as a barrier to free inter-migration: all such cases Mr. Darwin looks upon as exceptional to a generally-pervading law, that the individuals of a species have a contiguous range, and considers that they can be accounted for by occasional and accidental means of dispersal; for instance, by variations that have taken place in the level of the earth's surface, altering the form and relative contiguity of continents and islands, by which once-existing roads of migration have been obliterated; by ocean currents effecting the distribution of seeds and plants; by migratory birds carrying with them, over hundreds of miles of open sea, undigested seeds; by wading birds conveying and distributing, by simple adhesion to their feet, the young of small fresh-water mollusks, and seeds of fresh-water plants; by gradual changes of temperature on the earth's surface, as evidenced in the once-existing glacial condition of present temperate regions, causing the migration, northward and southward, of species to and from various zones of latitude.

The occurrence of identical alpine species on widely separated mountain ranges, Mr. Darwin suggests must have been effected by this process during the glacial period, the alpine species then spreading over the lowlands having been exterminated and replaced by temperate species on the returning warmth, except where they would be able to recede northward and up the higher mountains to suitable temperatures. We cannot, however, avoid the conclusion that the tropics must have undergone a corresponding diminution of temperature with the more northern zones, and would probably, when central Europe was ice-bound with glaciers, not have been warmer than our present temperate regions, inevitably causing the utter extermination of all animals and plants that were dependant on tropical heat for their existence, and necessitating a fresh special creation to meet the altered condition of the earth's surface on the return of warmth after the glacial period.

In reading the first thirteen chapters of Mr. Darwin's work, we must confess that, however widely we dissent from his conclusions, we go hand in hand with him in weighing the various phases of the question, and our most perfect confidence in his sincerity assures us that he is striving after truth, and that, with all openness and honesty, he is fairly

considering every difficulty that has occurred to him. In Chapter XIV., however, we seem merely to get a faint glimmer of what is passing in his mind. The reader has been gradually prepared for something beyond the conclusions that are previously stated, and we begin to wonder whether man's origin, the question inevitably suggested to every reader of 'The Origin of Species,' has been thought over by Mr. Darwin with the same amount of detail as the origin of brute species. We hope we do him no injustice in saying that there are several passages in Chapter XIV. which seem to hint at something which he dares not openly avow, and point at conclusions which may not be candidly stated. In his retrospective glances he knows not how far to press his theory, and in applying it prospectively there is an equally unsatisfactory indecision,—a quality of which the rest of the work is so characteristically void that we cannot help feeling it is intentional, and that he is shrinking from the open assertion of convictions which appear to clash with Revelation. At p. 523 (third edition) he says, "In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mutual power and capacity by gradation; light will be thrown on the origin of man and his history. * * * * * When I view *all beings* not as special creations, but as the lineal descendants of some few beings which lived long before the first bed of the Silurian system was deposited, they seem to me to become ennobled. Judging from the past we may safely infer that *not one* living species will transmit its unaltered likeness to distant futurity. * * * * * *As all the living forms of life are the lineal descendants of those which lived long before the Silurian epoch*, we may feel certain that the ordinary succession of generation has never once been broken, and *that no cataclysm has desolated the whole world*. Hence we may look with some confidence to a secure future of equally inappreciable length; and, as natural selection acts solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection."

We must confess these passages pain us, because we believe their thoughtful author must have considered their bearing upon Revelation. It is one thing to avoid carping at apparent scientific inaccuracies of the Scriptures and another to carelessly pass by and ignore all reference to Revelation. Everything like detail appears here to be scrupulously avoided; monkeys and gorillas are unaccountably passed by without notice; and notwithstanding Mr. Darwin leads us by inference to conclude that he considers the human species

is genealogically allied to brute life, he escapes the responsibility of clashing with Revelation by expressing his views in broad intangible generalizations, and makes a kind of sentimental theology do duty for Revelation, which his theory so unequivocally opposes. Does Mr. Darwin consider his theory of the origin of species consistent with the Scriptures? or is the question of its consistency a matter of indifference to him?

Dr. Asa Gray says that natural selection is compatible with natural theology; this is merely a truism, for who doubts that a religion built up of natural evidences is compatible with natural evidences? and if natural selection is a fact in Dr. Gray's estimation, his natural theology will of course be based upon it. We want, however, to know whether Dr. Gray and his followers are satisfied with "Natural Theology" as a substitute for the revealed will of God, and whether he considers that the weight of Revelation, which has been submitted to us simply for the acceptance of our faith, is to be valued according to its correspondence with the ever-fluctuating and conflicting views and experience of men of science?

Revelation must either be accepted or rejected by us *in toto*: there is no middle course. It is not to be pruned and docked according to our fancy and supposed experience, and then its mutilated remains honoured out of a conventional sense of propriety. If it cannot be accepted with every detail as it has been delivered to us it must be openly ignored altogether, and its honest denial is better than its qualified acceptance by those who ape it by "Natural Theology."

With regard to the theory of the progressive mental advancement of the human race, hinted at in Chapter XIV., history affords little evidence to encourage it; a high intellectual condition is peculiarly the property of individuals, and, beyond a certain point, affords little advantage in the human struggle for existence and power of dominion. An unusual degree of intellectual endowment pervading a large proportion of a nation has, unaccountable as it may appear, invariably been the prelude to the nation's downfall. Rome and Greece gradually attained to this "acquirement of mental power" in an eminent degree, but beyond a certain point it was not a quality which profited the possessors in the power of dominion, for, as we know, they had to give way to their more barbarous conquerors, and their intellectual perfection was thus lost as a hereditary quality.

Nations and races may differ in their intellectual qualities, but we never see intellectual advancement go on in an uninterrupted career. The different nations and races of the world are continually fluctuating

in the progressive element, first advancing, then declining and becoming extinguished; these fluctuations, being dependant on a variety of qualities unconnected with intellect in its highest sense, deny the means of its hereditary accumulation for the collective advancement of the human race: even admitting the abstract theory of advancement, there would be a number of qualities at work competing for the line of progression; those benefitting man as an animal, in his sensual prosperity and power of existence and reproduction, would probably compete with and cancel the line of mere intellectual advancement; for, beyond a certain point, we know that the two are not correlated, and that in the ordinary economy of life a man of medium intellectual power is just as successful, accumulates just as much money, and leaves behind him as many children to populate the world, as the most brilliant genius.

God has ordained certain proportions of the social scale as essential to the well-being of a community, and whenever that proportion is unbalanced (as it soon would be on Mr. Darwin's theory of intellectual advancement) we see its effects in the decay and ultimate obliteration of nations.

The fresh conviction we have received from the perusal of 'The Origin of Species' is that there is a measure of truth in Mr. Darwin's deductions, that genealogical relationship between species is here and there true to a limited extent,—just to that extent to which naturalists are puzzled in discriminating forms which rank below what are universally acknowledged as good species.

The great bulk of varieties have so obviously an affinity for certain species that we instinctively acknowledge their genealogical relationship, and the great bulk of species have such strong individual characters that we are impressed with the opposite conviction concerning them; that here and there there are doubtful forms that are difficult to decide upon must be readily admitted, but the proportion of these doubtful forms is so infinitely small that it at once denies our using them as the means by which to graduate the identity of species with varieties; for if specific differences and the differences separating varieties were only in measure we certainly should find a regular gradation between the kinds of differences separating individual varieties and the kinds of differences separating individual species, or at all events a fair proportion of the forms of intermediate degree.

*A Contribution to the Natural History of Ants, NOT read at the
Linnean Society.* By FREDERICK SMITH, Esq.

THE ant, in intelligence, stands in the same relation to the rest of the Invertebrata that man stands in to the rest of the Vertebrata. This opinion is held by more than one naturalist, and was lately enunciated by one of the most philosophic enquirers of the present day. The known histories of the economies of various species of ants are so wonderful, and at the same time so well attested, that we are prepared to receive, not only as credible, but also as unquestionable, histories which otherwise would appear to many the creations of romance, the concoctions of enthusiasts, and possibly, by some, might be deemed nothing less than ridiculous absurdities.

Who has not read with unbounded astonishment of that species of Formicidæ which, blest with intelligence and sympathies above the rest of its tribe, mourns for and buries its dead with becoming solemnity, conveying them in mournful procession to their last resting-place? The funeral ant is a species registered in the annals of a learned Society.

“Go to the ant, thou sluggard; consider her ways and be wise:” this proverb may serve as a fitting prelude to a passing notice of another even more wonderful and intelligent species than the funeral ant; I allude to the agricultural or farming ant: we are lost in our admiration of the history of this intelligent Formica. We have long been familiar with the history of those ants which store up food for the day when no ant can work, and we admire the intelligent foresight exhibited by this Formica providens, but our admiration becomes unbounded when we are told the tale of the agricultural or farming ant. This intelligent creature, rivalling the most experienced agriculturist, first proceeds to clear the ground of all weeds or plants which might impoverish it, and thus reduce the chance of an abundant harvest; like an experienced farmer it selects the best seeds for planting, it digs the ground, it plants the seeds, and when the grain is ripe it gathers its harvest into its garner. More wonders are in store for us: the histories of the Formicidæ are beginning to be written.

Of slave-making ants we have long since heard, indeed we have become witnesses of their depravity, and *Polyergus rufescens* and *Formica sanguineæ* have been considered proper cognomens for such atrocious and ruthless invaders. There can be little doubt of their having learned to avail themselves of the barbarous custom of slave-

making from their superior in intelligence who stands at the head of the Vertebrata: this is not the only lesson they have learned, as will be shown by the following communication, received from a highly esteemed and intelligent correspondent:—

Addiscombe, East Surrey,
April 1, 1861.

“DEAR SIR,—My attention has been much devoted during the past season to the habits of our British Formicidæ, but I have most particularly observed the *Formica sanguinea*, and its victim *Formica fusca*; on more than one occasion I have witnessed the attack of the sanguine ant upon the citadel of the *F. fusca*. In the month of June last I witnessed an unparalleled display of intelligence on the part of the fuscous ant; where it acquired the knowledge necessary to enable it to arrive at the perfection which I observed in what I am about to relate will be obvious, I think, to all who read the account which follows. Outside, but near to its nest, I observed several columns of ants ranged in perfectly parallel lines, and what greatly added to my astonishment was observing that their heads were all turned in the same direction. I now observed an ant of the largest size, apparently larger than any in the ranks, advance in front of the foremost line; presently it raised itself upon its hinder legs, supporting itself upon the apex of its abdomen in a most threatening attitude, with its jaws widely distended: on turning to the lines I observed that every ant had assumed the same defiant attitude; presently the commander retreated several paces; the fuscous lines retreated also. The precision with which these movements were made was most admirable. They next formed into hollow, then into solid squares; every movement was as precise as those of regular troops on a battle field. What could all this tend to? what had so completely changed as it were the peaceful character of this ant, which now stood before me in ranks of dusky warriors?

“Whilst I was making these reflections I observed a line of the sanguine ants approaching; their march was rapid. When, on rounding a small hillock, they came in front of the line of fuscous ants, their march was brought to a sudden halt; confusion was evident amongst the disordered ranks; terror had seized the whole band of freebooters. The fuscous ants now advanced in a dense impenetrable column, the line of rash invaders broke up in confusion and hurried back to their own abode. The precise locality of these interesting manœuvres is the ground upon which the East Surrey Volunteer Rifle Corps meet for drill twice or three times every week.

“Let the name *Formica fusca* be henceforth forgotten; let the

volunteer ant be the cognomen by which hereafter we shall distinguish this most intelligent of the family of the Formicidæ, which, duly appreciating and fully estimating the importance of the great National and Patriotic Volunteer Movement, finds amongst its own communities subjects ready to band themselves into corps of defence against their natural enemies, the sanguine ants. That this feeling will spread amongst the fuscous ants cannot be doubted, and you will probably shortly receive communications from all parts of the country corroborating the above facts, and proving that the volunteer movement has spread throughout the country into every community of the fuscous ant."

FREDERICK SMITH.

Occurrence of Acentropus niveus at Hampstead.—A short time since my friend Dr. Knaggs informed me that when capturing *Paraponyx stratiotalis*, at the first of the Hampstead Ponds, he had taken and seen specimens of the above insect, so I arranged to accompany him on an early day, and make acquaintance with living examples of this, to say the least, inconspicuous insect, which, though provided with a name, has the misfortune of having a local habitation, the exact position of which among the Insecta has been and perhaps is now rather uncertain. Yesterday evening, therefore, we started for the locality, and, arrived there, immediately found a retinue of small boys who were clamorous in their demands for the "tiddlers" we should capture, and from their eagerness in watching our proceedings, rendered our position on the muddy side of the pond uncomfortably uncertain. A thick growth of *Confervæ* and other water weeds occupies the edges for some distance out, and sitting on these we soon saw the creatures we were in quest of, and as the Doctor was provided with a net, the handle to which was some ten feet in length, they were easily captured by carefully inserting it in the water, and so bringing *Acentropus* to land clinging to it. However, between eight and nine o'clock they began flying rather rapidly over the surface of the water and close to it, occasionally coming on to the wet mud, where I had to dispute the possession of one with a large white-bodied hunting spider, which gave chase in a most ferocious manner. The best mode of capture would be to have a small, almost flat net, on the end of the stout joints of a fishing-rod, and with this take them before they fly in the manner before mentioned; and I would certainly advise placing the specimens captured in a coleopterist's bottle with laurel leaves, or tin boxes, as, like most water-loving insects and plants, the little moisture they naturally possess is soon absorbed in a chip or pasteboard pill-box, and in the morning they are dry and brittle. From this cause, though I captured a considerable number, I have scarcely a dozen specimens worth pinning. Among those captured only two were females, both in the winged form and double the size of many of the males. I could see nothing of the apterous form of the female, and imagine that a boat and very careful searching must be required to find them. This is undoubtedly the nearest metropolitan locality for the species; the Croydon Canal, I believe, used to produce it, but the construction of the railway destroyed that locality.—*R. McLachlan*; 1, *Park Road Terrace, Forest Hill, June 18, 1861.*

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

June 3, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘Sitzungsberichte der Königl. bayer Akademie der Wissenschaften zu München,’ 1860, Heft 4, 5; presented by the Academy. ‘Proceedings of the Berkshire Naturalists’ Club,’ vol. iv. No. 4; by the Club. The ‘Zoologist’ for June; by the Editor. The ‘Journal of the Society of Arts’ for May; by the Society. The ‘Athenæum’ for May; by the Editor. ‘Catalogue of British Coleoptera,’ sheets O and P, two copies; by the Author, G. R. Waterhouse, Esq. The ‘Journal of Entomology,’ No. 3; by the Proprietors.

Exhibitions.

The President exhibited, on behalf of Mr. Charles Fenn, a specimen of *Saturnia Carpini*, the wings of which on the left side presented the coloration of the female of that species, whilst those on the opposite side, the structure of the antennæ, &c., agreed precisely with the male insect.

Mr. Lubbock observed that he believed none of these apparent hermaphrodites had been anatomically examined, and he thought it would be very interesting to ascertain how far the disposition of the internal organs corresponded with the external peculiarities.

Mr. Bond exhibited two remarkably large male examples of *Ennomos illunaria*, bred by the Rev. Joseph Greene from pupæ found at the roots of a lime tree at Newrath Bridge, near Wicklow; also two species of *Eupithecia*, which had been recently determined by Mr. H. Doubleday to be the *E. tripunctata* and *E. trisignata* of Herrich-Schæffer.

Dr. Knaggs exhibited drawings of the larvæ of these *Eupitheciæ*, executed by the Rev. H. Harpur Crewe, who had found them on *Angelica sylvestris*; and the larva of *E. helveticaria*, also received from Mr. Crewe.

Sir John Hearsey exhibited a number of beautiful drawings of the transformations of Indian Lepidoptera, with their food plants, executed from nature by the members of his own family.

Mr. Solomon exhibited specimens of *Ammæcius elevatus*, from Southport Sands, near Liverpool; and *Staphylinus latebricola* and *S. fulvipes*, taken near Folkestone.

Mr. Solomon also exhibited, on behalf of the captors, Messrs. D. and H. Moses, examples of *Byrrhus Dennii*, taken on Clapham Common, and a fine specimen of the rare *Myrmedonia Haworthii*, found under dead leaves in Dulwich Wood.

Mr. F. Smith exhibited a living example of *Aspidomorpha Sta Crucis*, a splendid *Cassida* from India, lately received at the British Museum, and the only one of a number sent which reached this country alive.

Sir J. Hearsey observed that he had frequently noticed this beautiful species in India, and that when his family visited the subterranean temples of Salsette they found it in some abundance on the island.

Mr. Waterhouse exhibited a series of specimens of *Ceuthorhyncus sulcicollis*, *Gyll.*, and a series of another species very much resembling the *C. sulcicollis*, but differing so as to lead him to regard it as a distinct species. The first mentioned insect is common

in the London district, and is found on the *Erysimum officinale* and perhaps some other plants; the second insect Mr. Waterhouse had met with at Highgate, in the neighbourhood of Box Hill, Surrey, and at Northfleet in Kent, always on the *Erysimum Alliaria*, and always unaccompanied by the *C. sulcicollis*. Its most obvious points of distinction consist in the constantly pitchy red colour of the tarsi, and the under parts of the body and the sides of the chest being very sparingly clothed with minute gray-white scales. In *C. sulcicollis* the under parts are pretty densely clothed with pale scales, and the little triangular plate on the side of the chest, which partially separates the thorax from the elytra, is so completely covered with white or pale buff-coloured scales as to form a conspicuous pale spot at that part. These differences Mr. Waterhouse had formerly noticed when comparing a certain *Ceuthorhynchus*, presented by the British Museum by Mr. Walton, with the *C. sulcicollis*, but at that time he imagined Mr. Walton's insect (which was regarded by him as the *C. tarsalis* of Schönherr*) was a mere variety of the *C. sulcicollis*; he now finds, however, that the differences noticed are accompanied by others; the red-footed insect differs from *C. sulcicollis* in having the antennæ longer, the thorax more coarsely punctured, the pointed tubercles at the apex of the elytra less distinct, and the interstices of the striæ subgranular. The tarsi, moreover, are shorter and stouter, and the femora are more strongly toothed. The dark colour of the under parts, owing to the scarcity of scales, forms a marked difference when the under side of this insect is compared with that of *C. sulcicollis*, and when the male sex of each species is compared more important differences are seen. In the male *C. sulcicollis* the penultimate abdominal segment has two approximated small tubercles, and the last segment is concave in the middle third, the concavity being bounded on each side by a slightly raised ridge; the chest, moreover, is slightly concave; in the other *Ceuthorhynchus* the chest is strongly concave in the middle; the penultimate abdominal segment is simple, and the concavity on the last segment is bounded on either side by a well-marked conical tubercle; the under parts are likewise less thickly punctured. The *C. picitarsis* of Schönherr is compared by its describer to the *C. sulcicollis*, from which it differs in having the tarsi pale ferruginous, and in having the under parts of the body very sparingly scaled, and so far agrees with the insect to which attention is directed; but *C. picitarsis* is said to be somewhat smaller than *C. sulcicollis*, the elytra to be glossy olivaceous-black, with the interstices of the striæ distinctly transversely rugulose, the legs somewhat slender, and the femora armed with a minute tooth, characters which do not apply to the insect exhibited; it appears, in short, to be undescribed, and Mr. Waterhouse proposed for it the name *inornatus*. The leading characters are as follows:—

CEUTHORHYNCHUS INORNATUS.

C. niger, parum nitidus, subtus parce albido-squamosus; tarsis piceo-ferrugineis; thorace profundius punctato, canaliculato, obsolete bituberculato; elytris subsulcatis, interstitiis rugulosis subgranulatis, apice indistincte muricatis; pedibus validis, femoribus fortius dentatis.

The Secretary read a paper by T. V. Wollaston, Esq., intituled "On the *Ptinidæ* of the Canary Islands."—*E. S.*

* On a former occasion Mr. Waterhouse called the attention of the Society to what he believed to be the true *C. tarsalis*.

Three Days among the Bats in Clare.

By JOHN ROBERT KINAHAN, M.D., F.L.S., M.R.I.A.*

So few are the opportunities naturalists enjoy of studying the habits of bats in their native haunts, that, without further apology, I think I may venture to lay before the public details of three days' researches in the caves situated in the northern extremity of the county of Clare, in company with Mr. F. Foot, who had the good fortune to discover there, and record for the first time in Ireland, in 1859, the lesser horseshoe bat (*Rhinolophus hipposideros*), a species which must now, I think, be looked on as the bat of Clare, an opinion Mr. Foot has already put forward. In one or two trivial points I find that Mr. Foot's deductions from his own researches were too general; but in the main the observations which he has already published (*Proc. Nat. Hist. Soc.* vol. ii.) are fully borne out by those made during the tour at present described. As will appear, during this tour only one species of bat was met with, although the localities examined are far apart.

The caves are all situated in the same geologic horizon, the upper limestone. This rock throughout the entire neighbourhood is drilled and bored with caverns, often of great extent, with numerous passages and windings, serving, in many cases, as water-courses for the "buried" rivers which give rise to the sink-holes and turloughs for which the district of the Burren is famous. Whether it is to the presence and number of these caverns, or to the peculiar position of the district, that the occurrence of this species of bat in such abundance is due, may be a question; my own judgment, however, leads to the latter solution, judging by the plants and animals which frequent the district in question.

The Burren may be reckoned one of the most interesting of Irish districts, whether we look to its geological formation or its inhabitants; hundreds of acres of a formation seen nowhere else in Ireland—I had almost said in Great Britain—to such an extent, without seemingly a fault or break; bearing on its surface the manifest traces of ocean action, in high water-worn cliffs and coves far inland, in a surface nearly entirely destitute of soil, and in its picturesque scenery. On it, wherever a plant can grow, the Botany exhibited is such as is seen

* Read before the Natural History Society of Dublin, June 7, 1861. Communicated by the Author.

nowhere else in Ireland. The maidenhair fern (*Adiantum Capillus-Veneris*) grows in extreme luxuriance, and by the acre: that remarkable plant, *Potentilla fruticosa*, not known elsewhere in Ireland; *Ajuga pyramidalis*, hitherto only met with in the Isle of Man; and other plants of a similar kind, here grow in such luxuriance as no other part of Ireland can display. The hart's-tongue fern, filling every nook and cranny, exhibits a luxuriance of growth and variety of form which I have never seen approached, far less equalled, in any other district; *Grammitis Ceterach*, the maidenhair spleenwort (*Asplenium Trichomanes*), the wall rue and the black-stalked spleenwort, all brave the extreme fury of the western blasts, and, forsaking the neighbourhood of man, in which alone they are generally found in other places, plant themselves in every nook and crevice of the rocks and cliffs; the sea-side spleenwort attains a size, luxuriance and height which must be seen to be believed, and in its characters approaches to a Jamaican form. The yew clothes the bare cliffs; and *Gentiana verna*, *Dryas octopetala*, *Helianthemum canum*, and *Saxifragas* clothe every bank.

Of the animals it is scarcely necessary to speak. The curious Crustacea, such as *Pisa tetraodon*, *Xantho florida* and *X. rivulosa*, *Athanas nitescens*, &c.; the Echinoderms, such as Gaertner's spoon-worm, *Thallasema Neptuni*, *T. Sepunculi* and *T. Holothuriæ*; the mollusks and Actiniæ, of rare forms, found in nearly every creek, point to a district severed, as far as distribution is concerned, from all the rest of Ireland, and render it probable that to the same source, viz., the prevalence of a peculiar district-distribution, is to be attributed the occurrence and abundance of the bat referred to. But these speculations I hope to treat of more fully hereafter, and therefore pass at once to the proper subject of this paper.

Our first day's research (March 8th) was in caves near Inchiquin Lough. The first cave searched opens to the south, in the face of a picturesque limestone cliff, bounding one side of a deep ravine, destitute of trees except and odd stunted ash, but hung with the commoner ferns. Here we did not meet with any bats. We next proceeded to Vigo cave; this is at the edge of Inchiquin Lough, at the side of the road, at the verge of a dense plantation, and facing about E.S.E. The mouth of the cavern exhibits a fine geological section at the entrance, the roof being coal-measures, which, as the cave rapidly descends, is replaced by the lower limestone, crowded with fossils. The entrance of the cave externally is festooned with ivy, and tapestried with ferns, the most abundant of which are the hart's-tongue (*Phyllitis Scolopen-*

drium), maidenhair spleenwort (*Asplenium Trichomanes*), and the male fern (*Dryopteris Filix-mas*). A few plants of the lady fern (*Athyrium Filix-fœmina*), were just beginning to show their heads when our first visit was paid.

The access to the cave is by a steep slope, down which, at the time of our visit, a tiny stream was flowing, which soon lost itself in the rubbish on the floor of the cave. Having gained the bottom, the cave proceeds for some distance pretty much on a level, the floor being composed of a slippery tenacious clay of considerable depth; it then narrows, gradually ascends, and at length further progress is barred by a high cliff, up which we did not ascend, as the cave terminates at a short distance from this point. The breadth of the passage is moderate throughout, and the roof, in parts low, becomes, near the cliff, so lofty that our candles barely sufficed to show it in an indistinct gloom. I may observe that the clay in the floor of the cave was bored and caverned, either by badgers or otters, the track of whose feet might be plainly seen. A few stalactites of small size hung in parts from the roof, and the cave was tolerably dry; in one or two places there were small pools of water, but though I searched these carefully I could find no traces of the blind Acarinæ which had occurred so abundantly to me in the caves of Dunmore, Co. Kilkenny, in a similar situation. We had not long lighted our candles and proceeded into the gloom, when my companion captured a lesser horse-shoe bat, hanging from a crevice in one of the side walls of the cave, at a point where daylight was visible. In our progress to the end of the cave we captured another specimen of the same species, hanging near to the ground. When we reached the lofty chamber already spoken of we found the traces of the excrement of bats very abundant, and indistinctly through the gloom we could make out the forms of one or two bats, seemingly of considerable size, hanging from the roof, but far out of reach. During our return another specimen was found, near the place where the second specimen had been captured; and after the lights were extinguished, at the very mouth of the cave, in broad daylight, Mr. Foot detected a fourth. All these specimens were males. The only other living thing seen in the cave was a moth (*Triphosa dubitaria*), which was by no means rare, and found in all parts of the cave, even the darkest.

We next proceeded to the plantations on the western shore of the lake: here, in a cliff covered in profusion with ferns,—especially that lovely variety of the common polypody (*Ctenopteris vulgaris*) to which the names “hibernicum,” “semilacerum,” “pseudo-cambri-

cum," "sinuatum," &c., have been given,—are two caves of small extent, not more than a few yards deep, and facing northward and eastward, their mouths embowered in trees and hung with ferns. In the first of these we did not meet with any bats; in the second, which is extremely small and dirty, I found two bats, and numbers of a large mottled spider which I have not yet identified. Both the bats were males, and both were visible in the daylight.

A few days afterwards we examined some caves near Kilcorney: the first of these scarcely deserved the name of a cave, being a large chink in the face of a cliff totally destitute of trees, open throughout to the full blaze of the sunlight, insomuch that the sides of the cave to its very end were hung with maidenhair spleenwort (*Asplenium Trichomanes*). The second cave—*par excellence*, the cave of Kilcorney—is of very great extent; the mouth is small, and so narrow at one part that we could only squeeze and wriggle in sideways, and a fashionable lady would certainly have stuck. The roof of some of the passages is so low that one requires to crawl flat: it is a fine example of an under-ground river. The roof exhibited many traces, such as streams, &c., of the recent passage of water, which had gained access by the numerous vertical clefts and shafts, with which the roof abounds; and the pebbles and rocks on the floor were much rounded and water-worn, like those in the bed of a brook. The heavy rain which was falling outside rendered the examination of this cave hazardous, as floods come on very rapidly: we therefore spent only an hour in the cave, during which time a considerable number of passages were examined, but fruitlessly as regarded bats, the only living creature met with being a small frog found by me at the farthest point; probably it had been carried in by the winter floods. The absence of bats is not to be wondered at, as, during winter floods, a strong stream issues out of and completely fills the mouth of the cave; and a farmer in the neighbourhood told us that only two days previously to our visit the stream coming out had been so strong as to flood the adjacent meadow.

Our next day's excursion (March 22nd) was to the caves near Ennis. The first we visited was Balliallia cave; here Mr. Foot first discovered the horse-shoe bat, on the 10th of March, 1859; and in his paper (*Proc. Nat. Hist. Soc. Dub. ii. 152*) he gives the following graphic description of the cave:—

“The cave penetrates nearly twenty yards in a westerly direction, through strata of limestone, which dip to the east at an angle of five or ten degrees. The entrance is through a hole in the ground, four

feet square, on the slope of a hill facing the east. The interior is divided into three compartments. Descending a few feet, we reach the door-way, which is four feet wide by three feet six inches in height; its sides built of dry masonry, and a large flag of limestone for the lintel. Passing through it, we stand, or rather stoop, in the first compartment, which is eight feet long, five high, averages five feet in width, and contracts at its further end to an aperture two feet wide, by which the second compartment is entered.

“ We now take leave of the daylight, and, lighting a candle, perceive that we are in a chamber twenty-two feet in length, ten in width, and nine feet in height. Evidences of human occupation of the cave are also seen here, as there is a bench of rough stone-work, two feet high, at each side, probably erected by distillers of illicit whiskey, as report says that formerly this cave was one of their places of resort. The ceiling presents a varied appearance, being in some places rough with projecting points, which form nooks and crannies; while in others the flat under-surface of the beds of rock appear fretted with incipient stalactites. I call them incipient, as they do not attain to any length, but form a kind of bead-work arranged in polygons. From this, through an opening one foot six inches wide, we creep into the third compartment. It may be described as a rugged cell, twenty-four feet in length, varying from two to four in width, and averaging four in height.” Although not surrounded itself with trees, the cave faces a plantation only a few feet distant from it.

The day of our research was a very fine one, but the weather previously had been very severe, with sleet and rain and wind, the former in many places lying piled up unmelted. The innermost and middle chambers of the cave were very wet, and there was a good deal of moisture even in the outer chamber. Here we met with nineteen bats, all males except one. Of these, six were in the dark part of the outer chamber, hanging separately and at every height from the floor of the cave; seven were in the middle chamber, also hanging at various heights, one being only a couple of inches from the ground; and six were in the last chamber, five closely crowded together, but not clinging to each other, and dripping with wet. The ground was in parts quite black with their dirt. The other animals found here were the moth and large spiders already spoken of, and gnats in great numbers; the latter were alive, but seemingly torpid, as, unless touched, they did not stir. It was most interesting to see the bats wincing from the light. I examined each specimen carefully, and found they were all of the one species, and the greater part full-

grown. Mr. Foot seemed to think that the fact of some of these bats being met with in wet parts of the cavern was due to their roosting-place having become wet subsequently to its selection.

We then proceeded to Ennis, and, Dr. George O'Brien kindly accompanying us, we drove out to Edenvale. Here we examined three caves, likewise in the limestone, the general external features of which were all similar; they are situate in a dense old plantation: the entrances of the caves were hung with ivy, and the variety of *Ctenopterus vulgaris* already spoken of.

In the first cave, which is of considerable extent, and very wet in parts, we met with twenty-one bats; the greater part of them hung in company, in a tolerably dry side-alley of the cave. I examined the bats, and found all here to be males. The moths occurred in this cave also. The second cave, which is very small and low, I examined alone; it was very dry. I only found one male bat. The last cave examined is very capacious, with numerous side passages, some of which are so low and narrow as to oblige you to crawl through them; there are ponds of water, too, which require caution. Here we met with five bats, one of which was a female; they were scattered through different parts of the cave, all in the dark, and the female was hanging alone. Spiders, gnats and wood-lice also occurred. The narrow passage terminates rather abruptly in a deep well, which might easily entrap an incautious explorer.

The last opportunity I had of exploring a bat cave was on Easter Monday (April 1), a lovely spring day, the first of the season; when, being again in the neighbourhood of Vigo, we paid that cave a second visit. I found two bats only, the weather having been mild and open for some days previously, as was shown by the numerous wheatears (seen for the first time in the Burren on the 27th of March) flitting about, and by the chiffchaff, which, for the first time, I heard this day in every grove and plantation I passed through. Singularly enough both the bats were females, though on our previous visit, more than three weeks before, all the four specimens met with were males. We did not revisit the other caves in this neighbourhood.

From these observations one or two general deductions may be drawn. In the first place, the number of specimens met with (fifty-four) being all of the same species, coupled with the fact that it has occurred at places as far apart as Inchiquin, Ennis and Quin, according to Mr. Foot, to which must also be added the neighbourhood of the town of Galway (as shown by a specimen captured by Prof. William King in 1858), giving an extensive Irish range of

distribution for the species, justify us in considering this the characteristic bat of Clare.

Next, the fact that out of eight caves examined (for we may exclude the chink at Kilcorney as too light) the bats occurred in six,—all of which were either in plantations or close to them, and most of them had their entrances hung with plants,—shows, in addition, that to the proximity of woods, to which the animals can resort in summer, is probably due their selection of these caves. Of the two caves from which the bats were absent, in the great cave at Kilcorney no terrestrial animals could exist through the winter, owing to the floods; the second cave, at Inchiquin, is very small.

Another point, already put forward by Mr. Foot, which may be looked upon as proven, is the fact that the sexes hibernate apart. I took great pains to be accurate as regards this, and examined every specimen myself individually; yet out of the fifty-four I only found *one* female to nineteen bats at Balliallia, and *one* female to twenty-seven at Edenvale, which occurred in the third cave, and in a separate part of the cave from that in which its four fellow tenants were hung; and *two* females were the sole denizens of Vigo cave on our second visit: *four* to *fifty-four*, a very great disparity. It may be recollected that though Mr. Foot records having examined twenty specimens in 1859, he only met with *one* female. I am sure that we did not leave any part of the caves visited unexamined, except the roof of the last chamber in Vigo cave; and I think it likely that the two females which we met with there had awakened from their hibernation, in some other part of the cave, probably this chamber, under the influence of the mild weather, and had gone to sleep again.

With regard to the kind of place the bats select, although some of those in Balliallia were dripping with wet, they, as a rule, certainly prefer the dry places, and also, I think, the darkest spots, as they are much more numerous and in a deeper sleep in such parts of the cave as are most deeply sunk in the gloom. On the other hand, it must be recollected that in nearly every case we found specimens in the daylight. In Vigo cave the bat was visible after the candles had been extinguished.

The numbers found congregated in the one place in Edenvale, and in Balliallia cave, show that solitude is not the constant habit of the bat. They certainly shift their quarters during their hibernation. In the third cave examined at Edenvale I found recent traces of the bats in several places from which the bats were then absent, and the two females captured at Vigo had not been where we found them at

our previous visit. It is probable that they find food, during these partial awakings, in the moths, gnats and spiders met with, in every cave, in company with them.

On a former visit of mine to Balliallia cave, in August, 1859, I could not find any trace of bats, although Mr. Foot found them there the March previous. This, coupled with our finding them so abundant on our present visit, shows that the surmise as to the animal's change of habitat in summer is correct. I am thus particular about the habits of these animals because so little is known of them. Of the specimens captured I brought several home, and placed them under a box; they lived with me for eight days, and, although they refused to eat, soon accommodated themselves to their quarters. One which escaped gave us a favourable opportunity of judging of their skill in avoiding objects about the room, and also in rising from flat surfaces. They scrambled and fought a good deal at night, but were quiet during the day. On several of them I found specimens of a large and disgusting-looking tick. The great proportion of the bats were full-grown, only about a tenth of the number being immature; these differed in no respect from the others, except in a lightness of colour and in the characters of their dentition.

J. R. KINAHAN.

July 1860

Extraordinary Assemblage of Shrew Mice.—While walking a few days ago with two friends along a beautiful country road near the seat of Sir Michael R. S. Stewart, Bart., at Inverkiss, on the Clyde, we were surprised to hear an unusual rustling in the dead leaves and grass at the bottom of the hedge. As naturalists always do, we stopped to discover the cause, and judge of our astonishment when we saw between one hundred and one hundred and fifty shrew mice running nimbly about, uttering their peculiar sharp cry. Our presence did not seem to disturb them, for they continued chasing and calling on one another. We tried to catch some of them, and one of our number, by putting his hand opposite to a shrew, had the pleasure of seeing it walking in. It died before morning, being smothered in the box in which it had been confined. I have always considered that they lived in pairs, and were not gregarious, and I have invariably found them to shun observation, and exhibit a dread and fear of man, but in this instance both of my previous ideas of their habits were overturned, for here they were in scores, surprising us with their boldness and bravery. I tried to bag one, and it was only after making a dash at some score of them that I caught one. When I tried to catch any, they would suddenly make a wheel backwards, and, uttering a shrill cry, turn right round and cross instantly over the spot where my hand had been. When caught the little fellow showed fight, but his long pig-like nose saved my fingers from any harm. All the time we were there they continued to cry and run about, seemingly making themselves very happy. Perhaps some of the readers of the

'Zoologist' can give me an explanation as to whether it was a birth, death or marriage they were celebrating, or perhaps a general migration?—*William N. McCartney*; 98, *Hutcheson Street, Glasgow, May 21, 1861.*

Singular Advertisements.—I was amused at reading Mr. Broadbent's advertisement, reprinted at Zool. 7187. I send one to match it from the 'Calcutta Exchange Gazette' of April, 1861.

TO PROPRIETORS OF MENAGERIES.—For sale, a wonderful animal, called a MYTTON (of the male species), found in, and peculiar to, the wilds of Assam. As this extraordinary animal is rarely procurable it offers a splendid opportunity to those Gentlemen who wish to add to their Menagerical curiosities. Cash price Rs. 350. Apply to the Printer.

The said creature is a fine young bull gayal (*Bos frontalis*), since purchased by my friend Bábu Najendra Malliká. He ought to be shipped for England forthwith, for, however healthy now, it is quite certain that he has no chance of surviving the hot and rainy seasons of Lower Bengal.—*E. Blyth*; *Calcutta, April 4, 1861.*

Notes on the Birds of Belgium. By HENRY L. SAXBY, Esq.

(Continued from p. 7543).

Goldencrested Regulus (*Regulus cristatus*). Common in winter, but not often seen in summer.

Firecrested Regulus (*R. ignicapillus*). Of common occurrence in winter, frequenting woods and hedges, sometimes in company with *R. cristatus*, which it very much resembles in habits and general appearance. In severe weather I have more than once observed it upon the limes on the Boulevard de Waterloo.

Great Titmouse (*Parus major*). Permanent. One, which had been in confinement for a few hours only, was remarkably familiar, and would take hemp seeds from the hand, resting them between its feet while it broke them open with its bill.

Blue Titmouse (*P. cæruleus*). Permanent.

Marsh Titmouse (*P. palustris*). Not uncommon in low grounds.

Longtailed Titmouse (*P. caudatus*). Permanent.

Pied Wagtail (*Motacilla Yarrellii*). Permanent. One evening in October a flock, consisting of upwards of forty individuals, flew close above me in a north-easterly direction, directly against a strong breeze.

Gray Wagtail (*M. boarula*). Chiefly in spring and autumn, only a very few remaining to breed.

Grayheaded Wagtail (*M. flava*). Arrives early in April and leaves in September. Extremely abundant in low meadows and near rivers, feeding upon small worms, larvæ, aquatic insects, small univalves, and sometimes upon small winged insects. The nest is not very difficult to find, being usually situated among coarse grass and low bushes near the bank of a stream. In form it is not unlike that of the pied wagtail, but the nature of the materials varies considerably in different nests. One now in my possession is made of hay, flowering heads of grasses, a few very fine roots, two or three feathers, silky cocoons of several kinds, and a small quantity of moss, the whole being neatly lined with fine grass, wool and feathers. The eggs are pale buffy white, mottled all over with several shades of grayish yellow. A few small blackish lines may sometimes be observed upon the larger end. I never found more than six eggs in one nest, although the birdcatchers assured me that they had seen as many as eleven.

Tree Pipit (*Anthus arboreus*). Arrives about the middle of April.

Meadow Pipit (*A. pratensis*). Permanent.

Skylark (*Alauda arvensis*). Permanent. Cream-coloured and light brown varieties were much valued by the dealers, and were always offered at a high price.

Woodlark (*A. arborea*). Permanent?

*Lapland Bunting (*Emberiza calcarata*). On the 5th of March, 1853, I saw three living specimens in the hands of a collector, by whom they had just been purchased in the market. Their fortunate owner refused to afford me any information as to the time and place of their capture, but the worn appearance of their quills and tail-feathers, led me to imagine that they had been in confinement for several days at least.

Snow Bunting (*E. nivalis*). Occasionally visits the coast in winter.

Common Bunting (*E. miliaria*). Permanent.

Blackheaded Bunting (*E. schæniclus*). Permanent.

Yellowhammer (*E. citrinella*). Permanent.

Cirl Bunting (*E. cirlus*). Occasional.

Ortolan Bunting (*E. hortulana*). A summer visitor, appearing towards the end of April, and continuing to arrive in considerable numbers until the second week in May, by which time many of the females have already begun to lay. Its departure takes place soon after the young of the latest broods have become fully fledged, but I have observed stragglers as late as the 9th of September. Though it

visits most parts of the country, it seems to prefer those districts which are well drained and not very thickly wooded. Its note is a single loud chirp, repeated at irregular intervals, but sometimes so rapidly as to resemble an attempt at a song. Its small, shallow nest is placed on the ground in a field of young corn, seldom far from trees, and is composed of grass, small stalks of plants and fine roots, lined with fine grass and horsehair. The eggs are pale purplish white, with a few spots and streaks, and sometimes also with small comma-shaped marks of deep purple brown. In autumn great numbers of these birds are caught and fattened for the table. When in their most perfect condition the only part of the body which remains without fat is a narrow line along the middle of the breast.

Chaffinch (*Fringilla cœlebs*). Permanent.

Mountain Finch (*F. montifringilla*). Winter. A male in full summer plumage was seen by me in a small wood near Ixelles, on the 7th of May, 1853. Possibly it had escaped from confinement, for at that time many of the same species were still to be seen caged in the markets and elsewhere.

Tree Sparrow (*F. montana*). Permanent.

House Sparrow (*F. domestica*). Permanent.

Greenfinch (*F. chloris*). Permanent.

Hawfinch (*F. coccothraustes*). Permanent. The young are sometimes fledged by the end of May.

Goldfinch (*F. carduelis*). Permanent.

Siskin (*F. spinus*). Winter.

Linnet (*F. cannabina*). Permanent.

Lesser Redpole (*F. linaria*). Permanent?

Mealy Redpole (*F. borealis*). Winter. In spring the breast and rump of the male change from dull pinkish white to pure rose-colour.

Mountain Linnet (*F. Montium*). Occasional. Winter.

Bullfinch (*Loxia pyrrhula*). Permanent.

Crossbill (*L. curvirostra*). There can be but little doubt that it occasionally breeds in the Forest of Soignies, from whence I have obtained young birds scarcely fledged in July.

Starling (*Sturnus vulgaris*). Permanent.

Carrion Crow (*Corvus corone*). Permanent.

Rook (*C. frugilegus*). Permanent.

Jackdaw (*C. monedula*). Permanent.

Magpie (*C. pica*). Permanent.

Jay (*C. glandarius*). Permanent.

Nutcracker (*Nucifraga caryocatactes*). Occasional.

Green Woodpecker (*P. viridis*). Permanent. I once found turnip seed in the stomach.

Spotted Woodpecker (*P. major*). Permanent. Fresh eggs were brought to me as early as the 28th of June.

Creepers (*Certhia familiaris*). Permanent. In winter the Park at Brussels is a favourite resort.

Wren (*Troglodytes europæus*). Permanent.

Hoopoe (*Upupa epops*). Occasional.

Nuthatch (*Sitta europæa*). Said to breed in the Forest of Soignies, but I did not even see the bird itself in the breeding season, and, indeed, at all times experienced great difficulty in procuring specimens.

Cuckoo (*Cuculus canorus*). Summer.

Kingfisher (*Alcedo ispida*). Permanent. Breeds annually in the banks of the Senne, within a mile of Brussels.

Swallow (*Hirundo rustica*). Summer.

Martin (*H. urbica*). Summer.

Sand Martin (*H. riparia*). Summer. Very abundant in the immediate neighbourhood of Brussels, particularly among the sand-pits near the Quatres Louise.

Swift (*Cypselus apus*). Summer.

Nightjar (*Caprimulgus europæus*). Summer.

Ring Dove (*Columba palumbus*). Permanent and abundant, the numerous beech woods affording it both food and shelter.

Stock Dove (*C. ænas*). Summer.

Turtle Dove (*C. turtur*). Summer.

Pheasant (*Phasianus colchicus*). Permanent.

*Black Grouse (*Tetrao tetrix*). Occasionally seen in the markets in autumn and winter, but only in very small numbers.

Partridge (*Perdix cinerea*). Permanent.

*Redlegged Partridge (*P. rubra*). Permanent?

Quail (*P. coturnix*). Summer.

Bustard (*Otis tarda*). Occasional.

Golden Plover (*Charadrius pluvialis*). Winter.

Dotterel (*C. morinellus*). Occasional. Summer. A male caught in August lived for some weeks in a large cage, feeding upon earth-worms and hard-boiled yolk of egg.

Ringed Plover (*C. hiaticula*). Permanent.

Kentish Plover (*C. cantianus*). Winter.

Little Ringed Plover (*C. minor*). Permanent. The eggs are much like those of *C. hiaticula*, but smaller and more finely dotted.

Gray Plover (*Vanellus melanogaster*). Winter.

Lapwing (*V. cristatus*). Permanent.

Turnstone (*Streptilas interpres*). Winter.

Heron (*Ardea cinerea*). Permanent.

Purple Heron (*A. purpurea*). This handsome bird used formerly to breed regularly in many parts of the country, but it is now comparatively rare, even in winter.

Bittern (*A. stellaris*). Occasional.

Little Bittern (*A. minuta*). Occasional. Not unfrequently seen in the Brussels markets.

Redshank (*Totanus calidris*). Common in winter. I have been informed that a few breed regularly every year upon the banks of the Meuse.

Green Sandpiper (*T. ochropus*). Spring and autumn.

Wood Sandpiper (*T. glareola*). Spring and autumn.

Common Sandpiper (*T. hypoleucos*). Summer. I saw two of these birds early in March, while snow was still upon the ground.

*Spotted Sandpiper (*T. macularius*). Two specimens now in my collection were purchased by me on the 15th of March, 1853. They were lying in a shop window, among a number of dunlins and ringed plovers, where they would probably have escaped my notice, had not my attention been attracted by their pale reddish brown feet and legs. I was unable to ascertain from whence they came in the first instance, they having been obtained in the market a few hours previously, but the absence of any marine odour suggested the probability of their having been shot inland. Upon dissection they both proved to be females. The stomachs contained coarse gravel and a few minute worms.

Greenshank (*Totanus glottis*). Occasional.

Blacktailed Godwit (*Limosa melanura*). Spring and autumn.

Ruff (*Machetes pugnax*). Summer.

Woodcock (*Scolopax rusticola*). Winter.

Great Snipe (*S. major*). Occasional. Winter.

Common Snipe (*S. gallinago*). Winter. A few remain to breed.

Jack Snipe (*S. gallinula*). Winter.

Curlew Sandpiper (*Tringa subarquata*). Occasional. Autumn.

Little Stint (*T. minuta*). Autumn.

Dunlin (*T. variabilis*). Permanent.

Landrail (*Gallinula crex*). Summer.

Spotted Crane (*G. porzana*). Summer. Arrives about the end of March. In its habits it differs very little from the water rail, but is far more restless and shy.

- Little Crane (*G. pusilla*). Occasional.
 Moorhen (*G. chloropus*). Permanent.
 Water Rail (*Rallus aquaticus*). Abundant in winter.
 Coot (*Fulica atra*). Permanent.
 Brent Goose (*Anser bernicla*). Winter. Very seldom seen inland.
 Shoveller (*Anas clypeata*). Winter.
 Pintail Duck (*A. acuta*). Winter.
 Wild Duck (*A. boschas*). Permanent.
 Garganey (*A. querquedula*). Spring and autumn.
 Teal (*A. crecca*). Permanent.
 Wigeon (*A. penelope*). Winter.
 *Redcrested Whistling Duck (*A. rufina*). Very rare. I saw but one, and that was a female, which was in a shop in Brussels, on the 15th of April, 1853. It was supposed to have been killed somewhere near the Scheldt, but the precise spot was unknown.
 Pochard (*A. ferina*). Winter. It probably breeds in Belgium, for young birds are frequently seen in the markets in August.
 Tufted Duck (*A. fuligula*). Winter.
 Goldeneye (*A. clangula*). Winter.
 Redbreasted Merganser (*Mergus serrator*). Winter.
 Great Crested Grebe (*Podiceps cristatus*). Permanent. I am inclined to believe that neither the male nor the female attain their adult plumage until the spring of the third year.
 Little Grebe (*P. minor*). Permanent.
 Cormorant (*Carbo cormoranus*). Occasional. Sometimes killed many miles inland.
 Blackheaded Gull (*Larus ridibundus*). Permanent.
 Common Gull (*L. canus*). Winter.

HENRY L. SAXBY.

Balta Sound, Shetland,
 May 26, 1861.

*Notes from the Journal of a Naturalist in Sweden.**

I NEVER recollect a worse season for sporting. The foxes appeared to have killed all our hares in the deep snow. The partridges in our neighbourhood have been swept off to a bird by the long and severe

* Reprinted from the 'Field' Newspaper of June 22. The writer is Mr. Wheelwright, now residing at Gardsjo in Sweden, and well known by a most interesting work on Australian Natural History.

winter of 1859 ; and I reckon that two out of every three clutches of capercally and black grouse were destroyed by the rainy summer. All the snipe-grounds were deluged ; and, except a little duck-shooting, our season was a blank, and the high, muddy state of the water spoiled nearly all the fishing.

Luckily, however, let the season be what it may, it can never be an entire blank to the naturalist. If it does not suit one bird it is sure to suit another ; and I have noticed one thing in collecting in the North, that every season is richer in some certain birds than another ; in some years we never get an egg of many of our rarer birds, whereas in others we find them perhaps as easily as the commoner species.

As soon as the woodcocks and fieldfares leave us we always know that winter is at hand ; and the arrival into the midland districts of the first flocks of waxwing chatterers, which migrate in thousands from their northern breeding haunts in autumn, passing over the country like a swarm of locusts, clearing off all the mountain-ash berries on their road, is a certain forerunner of the first snowstorm. Last year was a bad one for rowan berries, and we had but few waxwings. On November 23rd I saw, however, the first flock ; and, true to their natural instinct, they heralded the first deep fall of snow, although the heavy fall did not come till the second week in December, and perhaps the deepest fall was about March 22nd, when it snowed for thirty-six hours without intermission. The weather throughout the early winter was clear and cold, and we managed to get about the forests pretty well till the end of January. The river was open till December, up to which time a few ducks (I fancy the young goldeneye) remained with us ; and I also saw odd flocks of redwing, and occasionally a sparrowhawk, although all the regular summer migrants had long left us. The sledging was good throughout the winter, but the ice on the lakes was bad, and in many places, except just in the intense frost, dangerous.

The steamers were running to Carlstadt and even to Stockholm till the third week in November, and the communication was again open in the spring by the second week in April.

Although the weather throughout April has been delightful, the spring is backward. At the time I write (April 30th) very little ploughing has been done with us ; scarcely a bushel of oats sown, and not a tree is in leaf. We may, however, soon expect a change (and "time enough," I fancy the English reader will exclaim), for our last winter seemed to come on the 25th inst., when we had twelve hours' snow and 5° cold at night. With all due fear of 'Punch'

before my eyes (who has immortalized your old lady correspondent for prophesying a warm and early summer from seeing a wasp on the 11th of February), I prognosticate a finer summer and autumn in 1861 than we have seen for some years; although even now I fancy we have more snow in our northern sky, and shall yet have a few more severe night-frosts, for our spring migrants are certainly late; nor till I see the first yellow wagtail, or hear the glad note of the ortolan bunting, shall I believe that the winter is over.

The following list will give a pretty correct statement of the time of the arrival of such of our summer migrants as are already here:—

Feb. 10. Saw the first jackdaw, and a small flock of crows. Some few stragglers, however, had remained with us throughout the winter.

March 18. Saw male goldeneyes on the river. The females did not appear to come till a fortnight after.

About March 22. Saw the first buzzard, and a starling. The lark had been here a fortnight.

On the 25th the golden plover and chaffinches had come.

March 28. Saw the first kite, the first white wagtail, and heard a robin singing in the evening. Saw a large bat (I fancy the *Vespertilio discolor*) hawking about in the twilight.

About the second week in April the fieldfares, redwings and bramblings came back, many redpoles and siskins, and (except the green sandpiper, the stock dove, the woodcock, the common snipe, and the cranes, all of which have been with us for about a fortnight) these are nearly all the spring migrants that I have as yet seen. I have this evening seen the first troop of wild geese (I fancy Brent) pass over northwards, and this is a good sign that the season in Lapland will soon commence, although probably the steamers will not get up the Bothnia till the middle of May; but another fortnight will bring many additions to our northern fauna.

We have had a great many woodpeckers in our forests this year, and more of the three-toed and gray-headed woodpeckers than I can ever remember. Neither of these, however, breed with us. I observed in the severe weather that the woodpeckers here get much into the holes of trees for shelter, and I also observed that the gray-headed woodpecker much frequents the gable ends of wooden houses and buildings, and is by no means shy. I took the first nest of the great black woodpecker on the 16th of April, with five eggs. All the birds that breed in holes of trees go to nest early. I got two full nests (six eggs) of the *Strix Tengmalmi* the second week of April, and about the same time a nest of the brown owl and stockdove (very early for us). I got the

first nest of the crested tit on April 20 ; and the little *Parus borealis* and middle spotted woodpecker are just now going to nest. I have already seen one wild duck's nest with nine eggs, and have taken two nests of the common buzzard, which with us appears to breed earlier than any of the hawks. I know of a nest of the siskin just finished, and I have no doubt the missel thrush has long since laid. I took my first parrot crossbill's nest, with eggs, on March 6th, and the last on April 16th. But, at the risk of tiring your patience, I must now say a few words on the breeding habits of these rare and interesting birds, more especially as the correctness of my remarks on this subject, published in the 'Field' last autumn, being so directly at variance with all that has yet been written by the naturalists here, has been much doubted. I felt, therefore, not a little anxious to see whether the observations of a fourth season would corroborate those of the three previous ones, and I was determined not to leave a stone unturned. We had a great many parrot crossbills with us in the early winter, and I anxiously watched to see if they would remain here to breed. I hired a man (upon whom I could well depend) to watch the birds throughout the whole winter, with strict injunction to him not to shoot one, but to report progress to me every week on their habits. The consequence was that I have been most amply repaid, and have had the good luck to obtain twelve full nests of the parrot crossbill and eggs, one with the young in the downy state, and one with them just flyers. This has been most satisfactory, for what I have seen this spring has completely corroborated my previous remarks, and proved my statement to be correct to the letter, *viz.*, that the breeding season of the crossbill is as well fixed as that of any other bird, and ends about the middle of April (probably varying a week or ten days, but I do not fancy much more, with the season), and does not, as stated by all the writers on the Swedish fauna, extend over a period from the middle of winter to midsummer ; moreover, that the nest is never domed, as has been represented by our naturalists, but invariably, according to my observation (and I have seen nearly 100 nests of both species), open and rather shallow, with thick walls built exactly as I have stated in my previous remarks.

Strange to say, not a single pair of common crossbills bred with us this year. I only saw one flock, and that was early in March ; but they passed over south, and I fancy that they are not so hardy as the parrot crossbill, and in severe winters go further south to breed. As I was determined to be correct this year, in every instance when I took the nest I shot one or both old birds, and well I did so, for there is so little

difference, I now find, in size between the eggs of the common and parrot crossbill (except in the *very* old birds, who rarely lay more than three eggs), that the size alone can never be relied upon as a certain mark of distinction. In the winter and spring of 1859 and 1860, I did not obtain a single nest of either, for the snow lay too deep in our forests to get about; but that some bred with us at their usual time, even in that severe weather, was proved by the fact that in the end of June I shot two young parrot crossbills, which had probably left the nest two months. We had no very great supply of fir cones this winter, but plenty of fruit on the pines, and on these cones I fancy the parrot crossbill almost exclusively feeds. At any rate, although I have occasionally seen them on the fir trees, I can always feel certain, if I see any crossbills on a pine, they are parrot crossbills. After the 16th of April I have not got a single nest, although I have been seeking with double vigilance, to prove, if possible, that they breed later on. Curious that I found a new nest just completed about that time, which, however, the birds deserted without laying in. Could instinct have told them that the season was over, and that all their comrades had finished their tasks? I fancy the families keep together till the autumn, when they pack; but they do not always remain throughout the summer in the district where they breed. The common crossbill seems to go to nest a little earlier than the other.

It is not to be wondered at that so little is known of the breeding habits of a bird so rare and local as the parrot crossbill. It is not every one who cares to watch the forest when the snow lies a foot or two on the ground, and fewer still who can be depended upon as to the identity of the bird if they find a chance nest.

We began to catch the burbolt under the ice about the 5th of January, and the spawning season appeared to last till the middle of February; but the season has been a bad one. I ate the first smelt in Carlstadt in the first week of April: they were the finest I ever saw. I measured one about a foot in length, and we are just now beginning the pike season. In a letter from that veteran sportsman Mr. Lloyd, of the 12th of April, from Wenersborg, he says:—"Yesterday I was out with my rod, and killed a brace of trout, weighing together 30lbs.; but the day was desperately cold and windy, or I should probably have done better."

I don't know what your fox-hunting friends will think of us when they read the following passage:—Never were so many foxes shot in our neighbourhood as during the last winter; and although we have had a wolf or two sneaking about our forests, I did not hear of one being

shot. I only got one specimen of the pine marten, and only on one occasion did I see "spor" of the lynx; but, I am glad to say, the elk is gradually more and more spreading over our forests.

The woodcocks this year appeared to remain only a short time on the coast when they landed, but hurried up to their breeding haunts in the interior. A friend of mine, a keen sportsman, writes me word from Gothenburg that never in any previous spring were so few cocks killed there as in this. He only bagged four couple, instead of eighteen to twenty couple—his usual number every spring. They began to "road" with us about the second week in April; but when they first come up they seem to fly about most in the mornings, just at gray dawn. Now, however, they "road" regularly every evening, and in a good stand I can always reckon on five or six shots any night. I can't make out exactly what this "roading" is. I used to fancy it was the birds flying backwards and forwards over the forests to their feeding grounds; but now I fancy it is a kind of love-chase, at least in spring, for I observe that now they always fly in pairs after each other, toying in the air, uttering their peculiar call-note, "Korp, korp, kisseck, kisseck," and pass backwards and forwards over the same spot every ten minutes. It is a pity to shoot them now, and perhaps even more so later on in the season, when they have the young birds to provide for. Did any of your readers ever remark that a cock will sometimes drop when you fire at it, even if not touched with the shot? I have; and once, when I was loading, a cock passed very low over my head; I flung up my cap at it, and it fell as if shot.

Most of us who are at all accustomed to wander much in the forests are familiar with the prolonged mewling cry of the buzzard, and I fancied this call-note was peculiar to that bird; but one morning early in April I heard the same mewling cry from a tree in our garden, and upon creeping cautiously up, to my great surprise I found it was uttered by a jay. I have since remarked the same call, which has much deceived me, so exactly resembling the note of the buzzard, for never before did I hear the jay utter any other note than its usual discordant screech; I fancy this must have been the love-call.

Up to this it has been a very bad season for capercally, at least for the poachers who shoot them in the spring. They have displayed very badly in the mornings, I fancy, owing to the frosts, and I have not heard of more than about four being killed near us. This is lucky, and augurs well for the breed of the ensuing year, for it is not of so much consequence shooting the old cocks if they are only spared till May.

I had the pleasure one morning, while lying in a brush-but on a moss, watching the blackcock at play, to see a specimen of that rare bird the *Tetrao medius* of Linneus, or rackelhanne. About a dozen blackcock were "coo-oo-ooing" and flirting round me, some on the ground, others in trees, when all at once I heard a loud hoarse note which I knew did not belong either to a blackcock or capercally, and presently a male rackelhanne flew down and speedily put the blackcocks to the rout. The hens, however, would not notice him, and he soon flew away, probably disgusted with their coyness. I watched him very anxiously for some time, but he never came within shot; and although I have set a good price on his head, no one has yet had the luck to kill him.

Of all the sandpipers the green sandpiper is my favourite, and comes back to us at least a fortnight earlier than any of the others. I love to see them as they dash round over the tops of the trees, making the whole forest re-echo with their wild "chee-wheet, chee-wheet." I shall this year watch their breeding habits very closely, and see if they ever do lay their eggs upon the ground like the rest of the tribe. I shall also watch very carefully to see if I can detect the same pair of birds of any species bringing up two broods of young in one season; and I trust any of your correspondents who are interested in the rural economy of birds will do the same. I am still of my old opinion, and shall not alter it without very strong grounds.

I shall perhaps have good opportunities of watching the habits of the viper this year, for our mosses swarm with them. I wish I might be lucky enough to throw some light upon the disputed question of their swallowing their young; I perfectly agree with Dr. Bree, that conclusive proof is still wanting, and till an old viper has been seen to swallow them, killed directly, and sent for dissection to some competent person, we are at perfect liberty to doubt a fact of so extraordinary a nature. It is a strange thing that in a country abounding, as this does, with vipers, no naturalist has noticed the fact, and upon my mentioning the dispute to one of our best field naturalists here, he declared he had never even heard of such a supposition.

I have had good and frequent opportunities this spring of noticing the song of the redwing: although a sweet pretty song, it has neither the vigour nor rich gush of melody of that of the common thrush; it is much varied, rising and falling in cadences with occasional runs, not unlike the common robin, but far more powerful. I fancy, however, it owes much of its beauty to the calm quiet which reigns over all at the time when it pours out its evening lay from the depths of the

forest. As to the song of the fieldfare, it is very poor, and can hardly ever be distinguished among the chattering and clamour which always prevails when a lot of these lively birds get together.

Contrary to custom, this year I did not see the blackthroated divers till the ice had broken up, but I now observe that they, as well as the goosanders and goldeneyes, have paired, and are taking up their breeding quarters.

Collected Observations on Birds' Nests, &c.—Perhaps the following remarks on Mr. Newman's "Collected Observations on the Nests and Eggs of British Birds" may not be entirely out of place, as affording a little extra information to the young collector in certain localities:—

Peregrine Falcon. I have known of the occurrence of three nests within a range of fifteen miles of Carlisle, *viz.*, one near Gilsland Spa, a second near Talking, about eight miles south of the last-named place, and a third on the banks of the River Eden, opposite Nunnery. This last nest I discovered by watching the female. It was placed on a ledge of a perpendicular rock about two hundred feet high, nearly midway between top and bottom, and quite inaccessible without the aid of ropes. The late Mr. T. C. Heysham got the eggs from the first nest, and I stuffed the old female that was shot off the second nest.

Kestrel. Breeds entirely in woods in this part of the country, there being no suitable rocks. In Cumberland they choose either woods or rocks, in the latter situations frequently among jackdaws.

Tawny Owl. I knew of one nest in a hollow tree; the nest was about a foot from the ground, the entrance being about two feet higher. I found another nest in a cavity formed by the decayed root of a tree that had grown in the cleft of a rock, about twelve feet from its base. As far as I can recollect there was little if any nest in either of these cases. I knew of a third nest close to the ground, at the foot of a young fir tree; this was a rude nest of the bird's own making.

Pied Flycatcher. Of this bird I have had much experience. They generally select a hollow tree where the entrance is small, but when this was enlarged, to get out the eggs, I generally made up the entrance with pieces of bark, and they would again build in the same tree. Sometimes the redstart would contend for the possession, and in one case, where I had seen a flycatcher building, on my next visit, about a week after, I found one flycatcher's egg and a dead female redstart in the nest. The flycatcher, however, did not always conquer, as I afterwards found. One day, while passing along a footpath close to the side of the River Eden, in Barnwood, my attention was attracted by the sharp chick of a pair of redstarts and a male flycatcher; I looked for a hollow tree, but nothing of the kind was near, and on getting up to the stump of a felled tree about four yards up the bank I found, in a crack across the top where the wood had decayed, a female flycatcher sitting on her nest; she did not seem inclined to leave it, so I poked two fingers in below her, took out an egg, tried it in the river and found it to be nearly hatching; putting it carefully back I looked round for the redstarts, and found them behind some loosened bark in front of the stump; this I removed, as it faced the footpath and might lead to the discovery of both nests. On

two visits afterwards I found the redstarts had got and kept possession of the fly-catcher's nest, and had reared the young. The late T. C. Heysham was with me when we saw them nearly full fledged, and none but the redstarts were in attendance.

Dipper. Much sagacity is often displayed in selecting a place for its nest. I knew of one placed on a ledge of rock behind the shoot of a small cascade, on a little brook about four miles south of Carlisle. The fall was about twenty feet, but the water only detached itself from the rock about six feet from its base, where the stone had been hollowed out by the action of the water, where it pitched clean over, about a yard in front of the nest. I should never have thought of looking for a nest there, had I not seen the bird come out and fly up the River Pettrill, which was within twenty yards of it. In another case, about half a mile higher up the same river, I had a long search for a dipper's nest. It was situate on a bank about six feet high, at a bend of the stream, the loose shale and rock which had been scooped out by the floods leaving an overhanging edge, held together by the roots of trees and bushes. I knew by the actions of the birds that the nest was confined to a space of a dozen yards, but I looked in vain under the overhanging bank and among the old tree roots; at last, when raising my head, I caught sight of the entrance hole in the face of the overhanging edge, and so nicely was it made to correspond with the rest of the surface, both as to colour and form, that I could not distinguish it, except by the aperture. I had passed it repeatedly within three inches of my nose, but as the upper part of the opening projects beyond the lower in the dipper's nest, it could only be seen when raising the head from a stooping position. There are frequent cases, however, in which the dipper attempts no concealment, but then, though it may be easily seen, it is not so easy to get at; in these cases a ledge of rock is selected that goes sheer down into deep water, and the nest cannot be approached from above or from either side, except with great difficulty. In such cases the old birds become very pert, flirting about and chattering quite close to the nest. One of these places used to be occupied year after year (and I have no doubt there is a nest there at this moment, for they build early), near Southwaite Station, on the Carlisle and Lancaster Railway.

Ring Ouzel. I found two nests one day; one on a ledge of rock at Fisherplace Cascade, a waterfall on a small brook coming down from the Helvellyn Range, a little south of St. John's Vale.

Twite. I find the nest upon a moss, within a few miles of Warrington, always close to the ground, but always shaded over with a small bush of ling.

Dotterel. Mr. Heysham's account as quoted cannot be taken as a guide by those who intend to look for the eggs, for nest there is none. The birds do not select the summits of the highest mountains, nor do they lay their eggs where the fringe moss grows, but in a depression upon short dense grass a little below the summit. Mr. Heysham only saw the place where I found the first eggs, I believe, on record. This was on Whiteside, a short distance from the end of Swirreledge, the ridge which connects Whiteside and Helvellyn. I found another nest afterwards on Robinson, a mountain near Buttermere; the place selected was precisely the same as the first one. On the same day I found a young one, apparently only a few days old; it rose up close to my feet, and ran before me, or I should never have seen it. I may mention that the habits of the dotterel are different from the other plovers that I am acquainted with, viz., the golden and ringed plovers; these are somewhat noisy when you are near their nests, the dotterel goes off to a little distance and sits quite mute; one of the old birds belonging to the last nest I found sat motionless on a stone until I

approached within a few yards of it: the parent of the young bird that I found was different; it flew round me at a great height, uttering at short intervals a plaintive note, something like the call-note of the common linnnet (*Fringilla cannabinum*).—*Janes Cooper*; *Museum, Warrington, May 17, 1861.*

Iron Birds' Nests.—At a recent meeting of the Sheffield Literary and Philosophical Society Mr. Stirling Howard exhibited some horseshoe nails, as a sample of two gallons, by measure, of the materials which a number of pigeons had carried from a blacksmith's shop, and used to make their nests. The facts, as communicated by Mr. E. S. Howard, of Woodside, to the 'Sheffield Daily Telegraph,' are briefly these:—"Over one end of the blacksmith's shop is a rude loft, in which are a number of boxes, the domiciles of the pigeons. The nails, which were taken from canvas bags and other receptacles, are of the ordinary horseshoe kind, of various sizes, some new, others old and crooked. They were, however, laid with some regard to comfort, inasmuch as the points were not allowed to project upwards, but without the admixture of softer materials. This is the more singular, as there is abundance of straw, shavings, &c., in the neighbourhood. On these 'iron beds' the birds had laid their eggs, which were just ready for hatching when the discovery was made of the use to which the nails were applied. The nails when removed filled a watering-can holding about two gallons, one of the nests containing more than a stone weight. The eggs were destroyed. The pigeons are of the ordinary kind, but some of them have a cross between the 'carriers.'"

Collected Observations on Bird's Nests, &c.—I have been much interested in Mr. Newman's "Collected Observations on the Nests and Eggs of British Birds," and as he states he would be glad of information on the subject, I make free to notice a few points wherein my observations lead to rather different results, leaving the readers of the 'Zoologist' to put such value on my remarks as they may think proper.

Dartford Warbler. The eggs possess, I think, a distinct character, quite separating them from those of the whitethroat, lesser whitethroat and reed warbler, all of which they are sometimes said to resemble. The white ground colour and the distinct markings (or nearly so) sufficiently distinguish them; they never, so far as I have observed, possess the greenish ground met with in the other species. I had some twenty nests through my hands last summer, and found this characteristic pervading all of them. These birds were very plentiful for two years, but last winter has I fear destroyed the greater part of them. I never found more than four eggs in a nest.

Goldencrested Regulus. I have two nests this season, one with eight eggs, the other ten.

Meadow Pipit. I took a nest the week before last with only four eggs, hard set, and have before had them with only four eggs.

Greenfinch. Six eggs are not uncommonly found.

Rook. I have nests of eggs taken this season, varying in number from three to six.

Heron. Pale greenish brown; should probably be pale greenish blue; at any rate the heron's and bittern's eggs can scarcely be called the same colour.

Common Snipe. I have the nest and four eggs, taken this season in Hampshire, and knew of a nest and four eggs being also taken there last year, so that the South as well as the North of England may be inserted as a locality.

Common Shieldrake. Breeds regularly and commonly on the coast of Caermarthen-shire, South Wales. I have the eggs which I know to have been brought from there, and am expecting more this season.

Wild Duck. I had the eggs last year from a nest placed in a furze bush, in a moorland district in Hampshire, on the top of some very high rising ground, about a mile distant from any water.

Teal. Often breeds in Hampshire. I had the eggs from there last year; a nest of eight, found in an open heath, some distance from water.

Merganser and Goosander. All my mergansers have a greenish or a brownish hue, and have all a much more delicate glossy polished appearance in the shell than the goosander, which are of a coarser texture and strictly cream-coloured. "Equally blunt at both ends," however, does not apply as a marked characteristic.

Shag. I have seen eggs of this species, obtained by a friend of mine from the South of England, from a locality where the cormorant is comparatively rare.

Sparrowhawk. Out of a large series I have I find the markings are very nearly as often at the small end as at the large. I have lately received a nest of five, the most beautiful I ever saw, about one-half of the surface marked as dark as a kestrel's egg, in two of the eggs at the large end, and in three at the small end.

Redbacked Shrike. I have a long series of these, and find the greenish white colour more common than the pinkish white, the spots often forming a very decided zone.

Sedge Warbler. I have taken many nests, to a great extent lined with wool or feathers. The nests this season are composed almost entirely of sheep's wool (a flock occupying a field in the immediate vicinity).

Nightingale. I believe much more often suspended in a bramble, &c., near the ground than actually on the ground.

Blackcap. I have some nests quite correctly made, by no means "slovenly in structure," though of course to some extent retaining that character. Most, I believe all, I have seen are well lined with horsehair; I have one, the outer structure of which is almost entirely sheep's wool.

Marsh Tit. I have a beautiful nest taken this season out of an old hollow gatepost, a very solid closely compacted nest of moss, hair and wool, well mixed and connected together. There is, moreover, just enough rabbit's fur to confirm Mr. Newman's remark as to its usual presence where procurable.

Kestrel. I have a nest of five this season, four as usual, the fifth somewhat larger and pure white.—*Alfred Crowley; Croydon, May 20, 1861.*

Preservation of our Little Birds.—In the 'Times' of the 17th of May, the editor, in referring to the measures taken by Sully, in the reign of Henri Quatre, to preserve fish in the rivers of France, remarks, "Little fish were almost as scarce in France as little birds are now." Having passed many years of my life on that part of the Continent I can corroborate the statement with respect to the paucity of little birds, particularly songsters. Thinking that the "little fish" are now in good keeping, and may be safely left to the fostering care of Her Majesty's Commissioners, I would appeal through the pages of the 'Zoologist' (the only channel open to me) to country gentlemen, and ladies too, to use their best endeavours, before it be too late, to check, if they cannot prevent, the indiscriminate slaughter of our "little birds," or, possibly, after the lapse of two centuries more, an editor of a New Zealand 'Times' may have it to record that "little fish were almost as scarce in Britain as little birds are now." I have long deplored the destruction of our little birds (the large ones take care of themselves) even by the ornithologist, thinking, with others, that the telescope might frequently be substituted for the gun. The immediate cause of my taking up my pen is

that I have recently heard from a friend that a gentleman's gardener in this neighbourhood boasts of having, during the last season, shot six hundred little birds, among which, doubtless, were many of our rarer songsters, and the beautiful bullfinch too, a specially persecuted species by gardeners, on account of the injury, real or imaginary, it does to the budding fruit trees. It is also preyed on by birdcatchers, both professional and unprofessional, and though many of the females may be spared, still, as it is not a polygamous race, there is reason to fear that it will ere long become scarce, if not extinct. Formerly they made me periodical visits, feeding on the privet berries, but of late years none have appeared. During the late severe winter hundreds of thrushes must have been shot by idle men and boys, but for that the country ladies and gentlemen are not responsible. But I would suggest to all those who have a taste for strawberries, and not for music, that they forthwith supply their gardeners with nets, which are now procurable at moderate rates; besides this would obviate the necessity for powder and shot. To those who are lovers of birds more than of fruit no appeal is needed; they will never grudge so small a portion of the produce of the garden or orchard in return for the cheering song, or in consideration of the services rendered by most species in destroying the innumerable insects that infest our gardens during the summer months. Having called attention to this deplorable case, I trust the editor will take the matter up, and stigmatize such heartless and selfish acts as they deserve. I say selfish, for the parties concerned should reflect that they are depriving their neighbours of what they may value more than the choicest fruit. A market gardener might perhaps be excused, as there would be extenuating circumstances to plead, but for the gentleman there are none. It is fearful even to contemplate—if this be a fair average of birds destroyed on most properties—what the grand total would amount to could returns be obtained of birds killed by gardeners every summer in the United Kingdom.—*Henry Hadfield; Ventnor, Isle of Wight, May 20, 1861.*

Extraordinary Assemblage of Birds.—A most extraordinary disturbance among the feathered tribes occurred at Start Lighthouse a few nights since. Between ten and eleven o'clock the man on duty was surprised at discovering that a great number of birds kept flying against the lantern of the building. On going out he found, to use his own words, that they were like a swarm of bees, flying around and against the glass of the lantern, and dropping either dead or much exhausted. The wind at the time was blowing hard from the north-east with rain; after some time it became much calmer, the birds continuing to fly against the lantern, and increasing in numbers as it became more calm, until finally they reached the immense number of six hundred and ninety-two, which he picked up dead. He had the curiosity to weigh them, and their weight amounted to about 34 lbs. They consisted chiefly of sky larks, house sparrows, and several varieties of the smaller kinds of birds, amongst which was a cuckoo. This disturbance seems unaccountable: it evidently could not be any migratory flock, for then they would have been all of one species, whereas there were of several, and such a circumstance has never, we believe, happened before.—*Kindly communicated by Charles Prideaux, Esq., F.L.S.*

Arrival of Summer Birds at Blackheath.—The long frost and snow, the severe winter and the cold spring, have delayed the arrival of the summer birds of passage. The nightingale was heard in Shooter's Hill Wood on the 11th of April. April 17th, saw a redstart; 19th, a whitethroat; 22nd, one swallow flying due west, high over Shooter's Hill, one willow wren, two whitethroats; 26th, one swallow, one nightingale, willow wrens, whitethroats, redstarts; 28th, one swallow at Chiselhurst, and

one swallow by the round pond in Blackheath Park ; 29th, three swallows were hawking on the heath ; 30th, saw two swallows at Eltham moat, one swallow on the pond at Kidbrooke farm, one whinchat springing up catching gnats, one tree pipit. May 2nd, I saw a pair of willow wrens building, and mighty fussy and important they were about it : looking through my telescope along a path I saw a nightingale and a robin feeding together, and plucky little robin kept pecking and driving the aristocratic nightingale away ; 9th, one swallow, one whitethroat, one whinchat ; 12th, I met a pair of house martins in Lee Lane, and saw a pair building at Eltham, and four were hawking over the new houses in the Dover Road ; swallows located ; 15th, I was delighted to see two swifts at Eltham ; 18th, I saw one butcher bird, one flycatcher ; swifts, swallows, and house martins were disporting over Eltham ; 19th, I counted at once ten swifts careering over and chasing each other round the ancient church of Eltham, their birth-place for hundreds of generations. The swift is emblematic of life, liberty and velocity. The early swallows could not stay at home for want of food. I generally first meet with them on the old ponds. The season has been too cold to develope sufficient insect life ; I have seen none stay over water. I have walked many miles along the hedges of the roads and fields, scarcely meeting with a bird. The whitethroats alone are plentiful ; I find them creeping about the nettles at the bottom of a warm thick thorn hedge, picking up the little black ground spiders and the red ants. I have not seen a blackcap, a chiffebaff or lesser whitethroat ; I suppose I miss them through deafness. A source of unalloyed enjoyment, the sweet melody of the nightingale, the blackcap, the garden warbler and the woodlark, is lost to me. I can see a bird singing away joyously, and cannot hear a note. I can only just catch the last piercing note of scolding jenny wren. The house martins came with the warmth on Sunday, the 12th of May ; there was a strong S.W. upper current of clouds, while the under current was N.E. I send my notes of the birds I saw to show how late and slowly they have arrived : they are three weeks late. The swift is ten days behind his time. Vegetation this season appears to be three weeks backward.—*Matthew Hutchinson ; Blackheath, May 20, 1861.*

Occurrence of the Osprey near Winlton.—On the 19th of last May a beautiful osprey was caught in a wood near this place. It must have been wounded some little time ago, as it was in miserable condition, though its plumage was splendid. I have heard of them being seen at Tynemouth, which is about fourteen miles from here, but this is the first I ever heard of in this neighbourhood. It had got entangled in a bramble bush, and was unable to rise. It is in the possession of Mr. Edward Hutchinson.—*Thomas Thompson ; Winlton, May 22, 1861.*

Occurrence of the Osprey, &c., at Swatow.—Through the kindness of Mr. Caine, H.M. Consul at Swatow, I am able to record the acquisition of another osprey (*Pandion leucocephalus* of Gould, *P. haliaëtus orientalis* of Temminck). The specimen received in the flesh from Swatow is a male, and as I before had the pleasure of noting a female of this somewhat rare bird from Amoy in the pages of the 'Zoologist,' a few remarks on this male will also probably find acceptable place. Length 20 inches. Wing, 18. Tail, $7\frac{2}{10}$. Length of bill, $1\frac{4}{10}$; height, $\frac{9}{10}$. Tarsi, $2\frac{1}{10}$. Outer toe, $1\frac{1}{2}$; its claw, $1\frac{1}{10}$. Mid toe, $1\frac{9}{10}$; its claw, $1\frac{1}{10}$. Inner toe, $1\frac{2}{10}$; its claw, $1\frac{2}{10}$. Hind toe, $1\frac{2}{10}$; its claw, $1\frac{1}{10}$. Wing stretching $2\frac{1}{2}$ inches beyond the tail. The bill is measured from the gape horizontally, and the claws in their diameter. Bill grayish black, grayish blue on the basal edge of upper mandible and the basal third of lower. Lore dark grayish blue. Cere[the same, tinged with yellow. Legs pale flesh-blue, bluer towards

the claws, which are black; soles brownish. Inside of mouth light cobalt-gray, with more or less flesh-colour. Œsophagus about $\frac{7}{10}$ wide, distended at the proventriculus to about an inch or over, this with the stomach assuming the shape of a somewhat flattened pear, and the whole in length $3\frac{2}{10}$, widest part 2 inches. The coat of stomach thin and smooth, both inside and outside, with no visible muscles. Contents, remains of large fish. Intestines very long and thin, and varying from $\frac{2}{10}$ to $\frac{3}{10}$ in thickness; $\frac{4}{10}$ at the rectum. Cæca situate $3\frac{1}{2}$ from the anus, ovate and adnate, white, and about $\frac{4}{10}$ long. Testicles white, round and soft, about $\frac{1}{4}$ long. I have also to record from Swatow the first bittern I have as yet seen from China, though it is natural to suppose, from its general distribution throughout Asia, that it must be common in some parts of this empire. This bird answers perfectly to the description of *Botaurus stellaris* in Macgillivray, but is somewhat smaller, as will be seen by the following measurements. Length, $27\frac{1}{2}$ inches. Wing, 12. Tail $4\frac{2}{10}$. Bill along culmen, $2\frac{6}{10}$; along the edge of under mandibles, $3\frac{1}{2}$. Tarsi, $3\frac{6}{10}$. Hind toe, $1\frac{3}{10}$; its claw, $1\frac{1}{10}$. Outer toe, $2\frac{3}{10}$; its claw, $\frac{2}{10}$. Middle toe, $3\frac{1}{2}$; its claw, 1. Inner toe, $2\frac{6}{10}$; its claw, 1. A phalarope has also frequently been shot at Swatow. One man told me he shot no less than twenty of these birds out of a very large flock. One could not well be mistaken in the bird, from its conspicuously lobed feet. I have not been successful in procuring specimens, and cannot therefore refer it to any of the known species. Nearly every winter I am told these birds occur at Swatow, and are sometimes even found as late as April. The Chinese tell a wonderful story about their incubating their eggs under their wings while sitting on the water. I myself saw some years ago, about mid Formosa Channel, a flock of little sandpiper-like birds settling on the surface of a smooth sea: these I took to be phalaropes, but they might have been *Tringæ*, as I have known the latter to both swim and dive expertly when wounded; moreover from later accounts we learn that many land birds settle to rest on the water during their migration.—*Robert Swinhoe; British Consulate, Amoy, April 5, 1861.*

Blackbird with White Head and Neck.—The other day a fine cock blackbird was shot in this neighbourhood. The bill was bright orange as usual; the head and neck of a snow-white; some of the feathers on the breast are of a dark mahogany colour, and there is a little white about the wings; it is being preserved for a gentleman whose gamekeeper shot it, and is a very pretty specimen.—*Philip Crowley, Alton, April 22, 1861.*

Number of Eggs of the Dipper.—Mr. John P. Thomasson (Zool. 7544), commenting on Mr. Newman's article upon Birds' Eggs, says that he has more frequently found four eggs in the nest of the dipper than five (the number stated by Mr. Newman); and he adds that in one instance he found a nest with only three young birds. My own experience goes to reconcile the apparent discrepancy between the two statements. I have never found less than five eggs in nests built in the month of March; later in the season I have usually found four, especially when I knew the eggs first laid to have been taken; and on one occasion, when, contrary to my instructions, the second laying of four eggs were also taken, I have known the bird to lay a third time, and on that occasion she only laid three eggs. I know also, positively, that the dipper, even when not disturbed or robbed, will rear two broods in the season, and that the second brood is usually smaller than the first.—*R. Harvey; Leck Glebe, Co. Donegal.*

The Reed Warbler near Hull.—As I see in my edition of Yarrell that it is said the reed warbler has not been observed beyond Lincolnshire, I venture, at the risk of

a repetition, to record its occurrence in this immediate vicinity. In an old brick-field, covered with reeds, I found it last week in some abundance, discovering four nests on a cursory examination, each with eggs quite fresh. I also shot several specimens of the bird. In the same locality *Crex porzana* was observed last year, but I was not successful in finding it, owing probably to the density of the reeds and the bird's shy habits.—*N. F. Dobrée ; Hull, July 20, 1861.*

Mr. Saxby's unknown Warbler.—Mr. Saxby, in his 'Notes on the Birds of Belgium,' mentions (Zool. 7543) having met with a species of *Sylvia* previously unknown to him, and being still in doubt as to its proper name, expresses a hope that some reader of the 'Zoologist' might be able to set that doubt at rest. May I be allowed to suggest that, judging from his description, the bird in question is most probably the *Sylvia hippolais* (melodious willow warbler) of the British, and *S. hippolais* and *S. polyglotta* of continental writers, — a bird well known on the Continent, and fully described in Yarrell's 'Second Supplement,' from a specimen killed near Dover in 1848. Mr. Bree, in his 'Birds of Europe' (now publishing), describes a warbler as distinct from the melodious warbler, but so nearly resembling it in size, colour and habits, as to have been often confounded with it by authors: it is called Viellot's willow warbler (*Sylvia icterina*), and said to be common in Belgium, especially about Liege and Brabant, occupying damp groves and willow plantations, also dry hills planted with vines and fruit trees; it also builds in gardens. Mr. Saxby will observe, on examination, that the wings of these birds are much shorter, in proportion, than those of the wood wren, and that the whole under plumage is light yellow.—*John Gatcombe ; Wyndham Place, Plymouth, June 24, 1861.*

Habits of the Shell Parrot (Euphemia undulata) of South Australia, as a Cage Bird.—It is now a good many years since a pair of these truly elegant birds were kindly presented to me, having been just brought by their owner from the neighbourhood of Adelaide, where they are said to be abundant in a wild state, although not widely distributed. Though more frequently to be met with in this country than was then the case, they are still valuable, and at that time were only to be purchased at a very high price. Of course I was anxious to treat such treasures as they deserved, and especially to accommodate them in a manner that should induce them to set about the business of a nest, or rather of rearing a family, for nest, in the usual meaning of the word, they do not attempt. According to the information respecting their habits which I received from their kind donor, I had a curved wooden tube constructed to resemble the hollow branch of a tree, leading into a box at the bottom, and after covering all with bark and lichen, that it might look rather picturesque than disfiguring, it was fixed in a good canary's breeding cage, the lid of the little nest-box being made to lift up, so that I might occasionally see what was taking place within. The birds, however, though to all appearance perfectly healthy, as well as affectionately playful, feeding each other, and dressing one another's plumage in the amusing way common to their tribe, never took any further notice of the carefully constructed cradle than to sit side by side on the top of it. This continued for a year or two, when the hen suddenly died, I believe in a fit. My friend generously sent me another in her place, greatly to the delight of the poor widower, who had been very restless and unhappy when first left alone, coming close to me when I approached the cage with what seemed a plaintive cry of enquiry as to what I had done with his mate, whose lifeless remains he had seen me take away. When the new companion was introduced it was very soon apparent that the artificial branch had become an object of attention, especially to the

hen, who was often to be seen cautiously examining the aperture at top, venturing a little way in, and coming back as if frightened, then further and further by slow degrees, till at last she was heard most busily engaged in the box below. This was furnished with a bed of sawdust, to serve the purpose of the rotten wood and chips, which I had understood formed a resting-place for the eggs and young in a state of nature. Here, however, was displayed the difference between reason and instinct, for, instead of making use of what was provided, nothing would satisfy the bird but going through the process of biting, tearing and scratching the wood, as much as if it had been ever so necessary in some tree she had found for herself. At length, by dint of her efforts, she tore a hole through the bottom of the box, letting all the sawdust run out. To remedy this a stout piece of leather was nailed on, and the sawdust replaced. After several weeks' frequent running up and down, sometimes remaining so long below that I looked (in vain) for some result, I one day, on raising the lid, was gratified with the sight of a little white egg, about the size of a canary's, but rounder. The hen began immediately to sit. In three days there was another egg, and so on until five were laid. She sat for three weeks, the cock not sharing the labour with her, but industriously feeding her all the while, either in the box or when she came out on the perch. I do not think she ever once during the time went to the seed-glass or the fountain. She frequently, however, left the eggs for a minute or two, running fast backwards and forwards on the perch, as if to get all the exercise possible in so short a space, and then dived rapidly down the tube to her charge. Exactly at the end of the three weeks, a faint piping noise was heard from within the box, and much delighted were all who heard it to find a little, struggling, unclad bird, the reward of so much care and industry. Then came expectations of rearing a brood, teaching them to talk by early training, giving some to one's friends, and so on. But, alas! for only two days was the infantile parrot note to be heard; it grew less frequent by degrees, and then it ceased, the poor little bird was dead—a great disappointment. The mother, all the while it lived, was making a strange noise and bustle; and whether or not from the failure of that instinct she would have possessed if at liberty, it really seemed as if she did not know how to treat her offspring. Had she intended to kill it, a single stroke of her powerful beak would have been sufficient. The proper food was supplied, the usual canary and millet seed, with abundance of groundsel, which at this time the parents eagerly devoured, though when not so engaged they would take no green food, except a bunch of seedy or flowering grass, always their greatest luxury. The remaining eggs were not hatched, though all but one contained young birds in different stages of growth. After this six eggs were laid and sat upon, and one hatched in rather less time than before; the young parrot lived only one day, and three others shared its fate. The bird continued laying at times, but did not again sit regularly, and at last had a strange fancy for eating her own eggs. This pair lived after I had them, I think seven or eight years, when the cock died, apparently from old age, and the hen soon afterwards of asthma. I have since had another pair, the female of which was evidently very old when they came into my possession; the pretty yellow head had become spotted with green, and the bill and claws extremely long; after a short time the mandibles grew so much as to cross each other, just in the manner of the crossbill. It appeared to me that she was then unable to feed herself, or at least to shell the the canary seed. The cock, however, fed her frequently while she lived, but in two or three months, becoming quite infirm and decrepid, she died. Her faithful companion still survives, and must have been a great deal the younger bird. He is very much

tamer in his solitude than before, though now quite reconciled to his lot, merry and noisy, as well as having his lovely plumage still in its beauty. Perhaps for want of any society of his kind, this bird plays with the finger held to him exactly in the same manner as with the bill of a companion, caressing it gently, singing to it eagerly, and even endeavouring to show his good will by bestowing the seed he has shelled and swallowed, just as is the constant practice of these loving creatures with each other. This attractive pet has been in his present home about four years. I understand in some rare cases others have been successful in the attempt to rear a brood of shell parrots.—*K*; *Sudbury, May 14, 1861.*

Occurrence of the Golden Oriole and White Stork in Norfolk.—A very beautiful specimen of the golden oriole, a male in full adult plumage, was picked up dead at Felbrigg, near Cromer, about the 17th of last month (May). This bird, which is in the possession of Mr. J. H. Gurney, exhibited no appearance of having been shot, but, although perfect in feathering, had, from some cause, almost wasted away. About the same time a fine old female stork was killed at Woodbastwich. Solitary birds of this species are not very uncommon in our marshes, but the present example is perhaps worthy of record, since, on being skinned for preservation, it was found to contain an egg apparently ready for immediate extrusion, but a little cracked on one side, caused, most probably, by the fall of the bird when shot.—*H. Stevenson*; *Norwich, June 10, 1861.*

The Golden Oriole at Scilly.—I am pretty sure, from information I received from Mr. Augustus Smith, on his recent visit to the islands, that the golden oriole has been off and on at the islands. I do not much like forwarding to you doubtful information for a record of Natural History, but in this case the reader will be able to form his own opinion when it is said that a bright yellow bird, with black wings and tail, about the size of a blackbird, was seen at Scilly.—*E. Hearle Rodd*; *Penzance, June 20.*

Occurrence of the Golden Oriole at Shalfleet.—A beautiful male specimen of the golden oriole has been shot at Shalfleet, about six miles from here.—*Henry Rogers*; *Freshwater, Isle of Wight.*

Occurrence of the Roller near the Land's End.—I examined, yesterday, a female adult specimen of the roller, killed last week, in the Land's End district. Mr. Michael Roberts, of this town, who set the bird up, told me that there were well-developed eggs in the ovary.—*Id.*

Titmouse Nesting in a Letter-box.—A curious circumstance in Natural History has occurred, or rather is occurring here. Mr. J. Turrill has, by my permission, a letter-box fastened to some palings by my back gate, which opens into the public road. Letters are removed twice a day, and in so doing one side of the box is let completely down. When, however, this door (or side) is closed, the only entrance is the ordinary aperture, measuring in this case three inches by seven-eighths of an inch. In this box a cole tit has built a most elaborate nest, and with such extravagance (chiefly, I believe, at the expense of my cows) that, not content with the nest itself, which forms a rearing and sleeping apartment which no feather bed or eider down could match, she has actually thickly lined or carpeted the remaining portion of the box, evidently as a *day* nursery. In this luxurious suite of apartments she is now bringing up a family of fourteen or sixteen (it is said); and so far from being frightened and disturbed by the visits of Her Majesty's deputy or the real owner of the apartment—whom they no doubt regard in the character of landlord, whose rent is to be paid inversely, in the matter of slugs, grubs, &c.—these unfledged interlopers are

said positively to hiss like serpents at the entrance or exit of newspaper or letter. — *John T. Plummer* ; May 30, 1861.

Hoopoe in the Isle of Wight. — The hoopoe has been seen in several places in the island this year ; four have been killed and three more seen : three out of the four are in my possession ; they are very fine specimens. The ring ouzel has nested here again, close to my dwelling ; Mr. F. Bond has the nest and three eggs. — *H. Rogers* ; *Freshwater, Isle of Wight.*

Hoopoe killed on Plumstead Common. — On the 14th of May I had a very fine hoopoe brought me. It was shot on the morning of the 12th, on Plumstead Common, Kent. Upon dissection it proved to be a female ; some of the eggs were as large as No. 5 shot, and the stomach was full of the remains of beetles. The bird was very fat, and in splendid plumage. — *H. Whitely* ; 28, *Wellington Street, Woolwich.*

Kentish Plover killed in Devon. — On the 7th of May a female specimen of the Kentish Plover (*Charadrius cantianus*) was killed on the Plymouth Breakwater, by Mr. F. C. Kingston. On picking up the bird I immediately recognized the species by its black bill and legs. So far as I am aware this is the first recorded Devonshire specimen. Yarrell mentions one young bird being in the collection of Col. Montagu, now in the British Museum, but does not state from whence it was obtained. — *John Gatcombe* ; *Wyndham Place, Plymouth, May 14, 1861.*

Arrival of Summer Birds in the Neighbourhood of Plymouth. — March, 24th, wheatear ; 25th, chiffchaff. April 6th, sand martin ; 9th, willow wren ; 13th, swallow ; 17th, blackcap and redstart ; 20th, martin and puffin ; 22nd, tree pipit ; 25th, yellow wagtail and corncrake ; 26th, sedge warbler ; 27th, whitethroat and nightjar ; 28th, whinchat ; 29th, common sandpiper ; 30th, wood wren. May 1st, grasshopper warbler ; 4th, swift and whimbrel ; 7th, Kentish plover ; 10th, greenshank ; 12th, spotted flycatcher. — *Id.*

The Eared Grebe killed at Doncaster. — About the middle of May I had sent me a splendid specimen of the eared grebe, shot at Misson, about nine miles from here, on low marshy ground. — *Hugh Reid* ; 8, *Spring Gardens, Doncaster, June 12, 1861.*

Brent Geese in April. — I saw some brent geese on the 22nd of this month on our river. One which was shot from our boat was in beautiful plumage. It is unusual for these geese to remain so far south thus late in the season. — *Murray A. Mathews* ; *Raleigh, near Barnstaple, April 24, 1861.*

Black Swans at large. — A pair of black swans flew down here to-day. It would be very interesting to know where they came from. If any of your readers have lost them I should be glad to be informed of it. My men tried to catch them, but were unsuccessful. I have thirteen black swans about my place, and I think that the pair alluded to must have been flying over and were attracted by them. My old pair, which I have now had about eight years, continue to breed about three times a year. They have hatched more than a hundred young ones, and have reared about sixty, Hardly any that they have lost died a natural death, but most of them have been killed by the old ones dragging them about when they were not strong, and the cygnets have got into holes from which they were unable to extricate themselves. No weather seems to affect them, as they breed equally well in the most intense cold of winter or the greatest heat of summer. Last winter it was necessary to break the ice round the nest for them every morning, as they were completely frozen in : the nest was a mass of ice and snow, and the young birds, which I now have, did not suffer in any way from it. Can any of the readers of the 'Zoologist' inform me of a similar

instance of their breeding in this way? I may add that they had no shelter whatever.—*Samuel Gurney ; Carshalton, July 4, 1861.*

Occurrence of the Northern Diver in June.—On the 15th of the present month (June), when at Seaton, on the coast of Devon, I killed a great northern diver. Unfortunately the bird was in moult, and had but partially completed its summer dress. The fact of this species remaining so late on our coast is, I think, worth recording.—*John Gatcombe ; Plymouth, June 24, 1861.*

Occurrence and Breeding of the Lesser Tern (Sterna minuta) at Spurn Point, Yorkshire.—On a visit during the last week in May to Spurn Point, at the mouth of the Humber, we found the above graceful and not very common species breeding on the seaward side of the sandy neck of land that connects Spurn Lighthouse with the Yorkshire Coast. From forty to fifty pairs of these birds were hovering over a particular spot, and betraying by notes of alarm the presence of their nests. We discovered some half-dozen of the latter, all within the space of about five hundred yards along the shore, being apparently thus placed more from a love of company than any peculiarity in the spot selected. The nests were mere cavities scratched in the sandy and pebbly soil of the beach, and contained from one to three eggs, all fresh, proving, together with the limited number of nests, that the breeding season had but just commenced. The eggs were all deposited within a few yards of high water mark, and difficult to detect at first glance from their similarity to the rounded stones scattered about. We found several holes scratched out and ready for the reception of eggs, but whether abandoned from some cause or awaiting their complement of eggs was hard to tell. We were informed that these birds never breed on the Humber side of the neck, though the distance across is only about one hundred yards. The eggs correspond with those figured in Mr. Hewitson's work (second edition). It may be well to add that a specimen was shot to identify the species beyond doubt. In the same locality, and in several instances within a few yards of the nests of the above terns, the ring dotterel (*Charadrius hiaticula*) were breeding. In nearly all their nests the eggs were more or less incubated, in most instances considerably so, and in one case we were amused by the sight of a recently hatched bird running before us with the surprising velocity characteristic to this tribe, while the parent endeavoured to divert our attention in their well-known interesting manner. A few pairs of shieldrakes (*Anas Tadorna*) were also observed, said to be breeding on the holes of an adjacent rabbit warren.—*A. Dobrée, Hull.*

Kittiwake does not Breed in the Isle of Wight.—In reply to Mr. Hussey, concerning the kittiwake breeding in the Isle of Wight (Zool. 7547), I beg to give the result of my own observations during the seventeen years I have resided at Freshwater, during which time I have never missed visiting the cliffs in the breeding season, *viz.*, from May until autumn; and I assert, fearless of contradiction, that during that time the kittiwake has not bred here; nor do I believe that it has done so for the last forty years. I have made the closest inquiry of old inhabitants that I can depend upon, but not one of them can remember ever seeing the kittiwake in summer, except in very stormy weather. I shot a male in the breeding season of 1858, on a very stormy day; but this is the only specimen I have ever obtained in the summer. Although I collect the eggs of various birds from the cliffs every season, I have never obtained a kittiwake's; and men who have been in the habit of taking eggs from the cliffs for upwards of forty years do not know the egg. I know the lesser blackbacked gull bred here in 1857, but this is the only instance to my knowledge; in fact, the bird is

a rarity with us, even in winter. The only gull that breeds regularly with us is the herring gull, which occurs here in countless numbers. I think, therefore, that when the late lamented Mr. Yarrell saw the kittiwake it must have been during or after a storm, and that he might have been told that it breeds here. In winter the following gulls are common with us: — large blackbacked gull, herring gull, kittiwake, common gull, blackheaded gull. — *Henry Rogers ; Freshwater, Isle of Wight, June 17, 1861.*

[I ought, in justice to the memory of so distinguished a naturalist as the author of the 'History of British Birds,' to say that I am informed by a friend that Mr. Yarrell was fully aware of the mistake he had made about the kittiwake, and intended to have corrected it: he was the last man in the world intentionally to repeat an error: everything he either wrote or said was marked by the most conscientious love of truth and accuracy.—*Edward Newman.*]

A Shower of Fish.—The following extract from a letter from Singapore, addressed to the Academy of Sciences, by M de Castelnau will be found interesting:—"We experienced a shock of earthquake here on the 16th of February last. It was followed by rain in torrents on the 20th, 21st and 22nd. When the sun came out again I saw a number of Malays and Chinese filling their baskets with the fish contained in the pools formed by the rain. They told me the fish had 'fallen from heaven,' and three days later, when the pools were all dried up, there were still many dead fish lying about. I found them to belong to the *Clarias Batrachus*, which can live a considerable time out of water, and even move to some distance on dry land. As they lay in my courtyard, which is surrounded by a wall, they could not have been brought in by the overflowing of a torrent, nor is there any considerable one in the neighbourhood. The space covered by these fish might be about fifty acres. They were very lively, and seemed to be in good health. I have particularly remarked the singular occurrence of the fish, having already, during my stay at the Cape of Good Hope, had occasion to mention to the Academy the fact of several new species of fish being found after an earthquake. Is it admissible to suppose that a waterspout, in passing over some large river of Sumatra, had drawn up the fish and carried them over? It is not without fear I venture to suggest this hypothesis."

An Eel found in a Stratum of Shells.—In sinking the present new pit of the Carron Company, at No. 10 engine, one of the workmen, Mr. James Kemp, found an eel imbedded amidst a strata or layer of shells, nearly eighteen feet from the surface, quite lively, but so emaciated that the eel more resembled the broad-bladed leaf of a water flag than a fish of the eel species. Upon being brought to the surface, the serpentine and slimy fellow began to swell and elongate, assuming the usual shape, and measuring about fifteen inches. How the muddy gentleman found his way into the shell bed is matter of conjecture both to naturalists and several intimate with Geology.—'Falkirk Herald.'

The Crab and its Allies. By C. SPENCE BATE, Esq., F.L.S., &c.

(Continued from p. 7553).

To be a faithful naturalist requires patience. When keeping a lot of young crabs together, we perceive, after a time, that one begins to thicken a little and the carapace to lift up, so that the posterior portion of the thorax becomes more conspicuous behind. This crab will also be found not to feed; in this way perhaps one, two or more days pass away. Watching the same one still, it will be found desirous to remove as far as possible from the neighbourhood of its companions, seeking a crevice for itself, appearing anxious and distressed if intruded upon by any stranger, becoming very savage, and darting at anything which approaches it; but if left at peace, it will quietly remain until the time arrives when it hitches the point of one of its claws in some crack or crevice, and withdraws itself from its old skin, escaping between the carapace and the body of the animal. To anchor itself by some crevice appears to be absolutely necessary; for a crab kept in a tumbler of water appeared to have no power to free itself from the skin until a shilling was thrown into the glass, when it immediately hitched its legs beneath its weight and drew itself out of the old skin. Immediately it is free it enlarges to the full size of its growth, at which it remains until it again throws off the shell.

Réaumur stated that the process is one of great labour and difficulty, as well as duration. But my own observation upon the marine Crustacea bear out those made by Messrs. Gosse and Couch, that it is easily and quietly done, in a short period, without a struggle; but they seem to have the power of choosing their own time of performing the act, and will not, if possible, do it while any one is looking at them. I have often watched and waited for hours, scarcely taking my eyes off the trough in which they were, without success; but upon my return, after an absence of only a few minutes' duration, I have found the exuviae thrown off. Did I not say a naturalist requires patience?

It is an amusing story, an exciting game at hide-and-seek, to watch a crab. You run away a bit, but, fearing to stay too long and perhaps miss the whole, you just peep over the edge of the bason. No change; there sits the crab, with its eye upon you, come when you will; it only gives a jerk with its anterior antennæ, as much as to say, "Don't you wish you may get it!" So back you go again, and wait perhaps

a little longer. Peep again; there its black eye is still shining at you, and seems to wink. A ripple crosses the surface of the water. Patience! I said you must have patience. Well, after a time you look again; the carapace is a little up, but the eye is watching still. "Ah! there you are again!" It seems to mock you, as the cautious creature crouches closer in its corner. After being tricked many times, continually looking and leaving, which will be found the most successful method of watching, you may see the process fully carried out. The carapace is first raised; then the legs and the branchiæ are drawn out of the integuments, as fingers from a glove; the tail is then withdrawn; and then the legs are raised up and pushed against the carapace, which is pushed forwards over the head. I took one during the process, and gradually, as it was raised, cut the carapace away with a pair of scissors: the animal performed the process as usual until it came to pushing it over its head, and here it entirely failed, because the carapace, the portion against which it pushed its legs, was gone. The skin by little and little was freed, until at last it hung only by the eyes, and in this horrid condition the poor thing kept running about, dragging the old skin with it, until its eyes were almost pulled out of its head. No one can imagine the distress but an old gentleman who, having taken off his coat, has hitched it to his spectacles and could not get free. In this state the poor crab remained, and probably would have remained until decomposition of the soft parts had broken the exuviæ to pieces, had not charity come to its relief and pulled the old skin away, an act which almost appeared to bring the eye-balls with it, so firmly was it held.

When the old skeleton is thrown the crab is soft, fleshy, and incapable of defending itself, and is therefore very liable to fall a prey to larger animals, both of its own and other kinds. The soldier crab, which lives in the shell of a mollusk, retires within its abode, and throws off first the anterior portion, which it tumbles out; and then, with its cheliform legs, pulls off the posterior, which is a thin, pellucid skin, and throws it outside also. Of danger it seems to be aware, and, probably under the excitement of fear, is much more active and less easily caught than at any other time.

This process is not repeated so often in the adult as in the growing crab. In the larva state it probably takes place every few days; as the animal grows older weeks intervene, then months, and lastly the moult is but once a year, and it is probable that when age creeps on the process is not repeated so often.

This last statement is inferred from the fact that crabs have been

taken having on their backs a quantity of large and well-developed oysters, so large that the crab seemed almost hid by the foreign intrusion. It must therefore be true that either the crab does not, in its adult form, shed its skin once a year, or else that oysters grow much more rapidly than they are believed to do.

But whether it be during the larva state or that of the adult crab the process of development by which the shell is produced must be one and the same. Immediately above the heart a mass of nucleated cells is formed, extending to the internal surface of the shell, from which it is separated by a layer of pigment, which gives colour to the new formation. Towards the base of this mass—that is, immediately above the heart—the cells are uniformly large and distinct, while an areolar tissue ramifies throughout the whole. As advance is made cells of less size appear; these increase in number, as they diminish in diameter, until they approach the layer of pigment, immediately beneath which they adapt themselves, by mutual compressions, into a polygonal form. This mass of cell-structure extends throughout the entire surface of the crab immediately beneath the old skin, the greater or less thickness of the new mass corresponding to that of the old: these cells, being the organs which collect the lime within their own cavities, give strength and solidity to the future protection of the animal.

The manner in which the skin is removed, as carried on in the lowest forms, is modified only to meet conditions. In the amphipods, which we (Report Brit. Assoc. 1855) have observed in glass jars, the act is not of long duration, and the animal appears not only capable of swimming about until the moment arrives, but has the power, during the moulting, of removing at almost every stage, if it be disturbed, from one place to another, for better security. It grasps with one or more of its anterior feet some fixed weed or secure material as an anchorage; it then commences to free itself, which appears not to be an act of discomfort, if we may judge from the small amount of trouble with which the operation is conducted. The process appears, as in the crab, to be the result of an internal growth by which the animal has become too large for the skin. It splits at the margin where the dorsal and sternal arches of the three anterior segments of the pereion meet. After some tolerable exertion the posterior portion of the animal, together with its limbs, is withdrawn from its position in the old skin, and then follows the body, and lastly a few more struggles and the head is free, with the entire animal from the old skin. Unless disturbed, the animal, which is extremely

soft, rests for some time, as if exhausted, near the cast-off skeleton ; however, should there be any cause, it is capable of swimming away immediately.

The new creature is a perfect representation of the old one slightly enlarged ; every hair is produced complete. This is capable of demonstration before moulting, for we have repeatedly observed the new hairs attached to the new skin while examining specimens under the microscope, where the second layer of similarly furnished integuments is distinctly visible ; and it has always appeared to be a curious fact, and contrary to anticipation, that the new materials (hairs, spines, &c.) are not developed within each corresponding hair, spine, tooth, &c., they being visible as a second and independent armature.

The crevices among rocks and the shelter afforded by overhanging stones are the abodes of most of the larger crabs and lobsters, particularly those which dwell upon the shores. Great activity most of them possess, and will often, when the rocks are slippery, give much trouble and perhaps more than a single fall before you can secure one. Professor Kinahan states that in the Chinca Islands, "Running over shingle, foraging among the dead sea-lions and other animal and vegetable remains, climbing in immense numbers over the perpendicular faces of the cliffs above, the wrinkled beach-crabs (*Grapsus strigosus*), most striking from their gaudy colours, size and swiftness, cannot fail to arrest the attention of even an unscientific observer ; the chase after them, especially on the summits of the cliffs, is exciting, being fraught with danger through the slipperiness of the foothold. It was most laughable to see the way in which they would at times, after escaping capture, behind some inaccessible projecting point, peep round a corner at you, as though exulting in having eluded your pursuit. They may be often seen, too, in fierce combat on the rocks, but seemingly as careful as any delicate young lady of wetting their feet."

The abode of others appear to be chosen from a more decided advantage which is instinctively known to the animal. The pearly raspberry crab (*Porcellana perlata*), Professor Kinahan tells us, chooses the empty shell of the fixed Balani to coil itself in ; and we know that some, without being parasitic in the correct meaning of the word, attach themselves to fish or pieces of wood, and swim the ocean by their assistance. These latter have the last pair of legs so arranged as to have the appearance of being placed upon their backs, distorted from their normal position by the continual practice, from generation to generation, of straining the limbs to grasp at things *almost* beyond

their reach, just as artificial circumstances change the appearance and physical condition. A ready example strikes us in the flat-headed Indian. And Mr. Dilwyn, in his 'Contributions to a Natural History of Swansea,' tells us how a dog, having got its nose cut with a stone, ever after retained a cleft lip, a peculiarity that was exhibited in all its after progeny, and only gradually died out in future generations.

These floating crabs are generally pelagic, and found near the great sargossan beds, which extend, particularly in the North Atlantic, on every side, far beyond the distance that the eye can reach, like the swathes of an immense ocean-prairie.

Mr. Darwin, in his previously-quoted 'Naturalist's Voyage,' speaks of one of these crabs as of a very remarkable structure: "It is allied to the notopods (or those crabs which have their posterior legs placed almost on their back, for the purpose of adhering to the under side of the rocks). The penultimate joint, instead of terminating in a simple claw, ends in three bristle-like appendages of dissimilar lengths, the longest equalling that of the entire legs. These claws are very thin, and are serrated with the finest teeth, directed backwards. Their curved extremities are flattened, and on this part five most minute cups are placed, which seem to act in the same manner as the sucker on the arm of the cuttle-fish." As this animal lives in the open sea, and probably wants a place of rest, I suppose this beautiful and anomalous structure is adapted to take hold of floating marine animals.

But in Nature there is a wonderful distribution of animals, as if to demonstrate to us how small a change in physical condition is necessary to make apparently the same creature exist under directly opposite circumstances. We have seen that some crabs live without perhaps ever touching fixed ground; so there are others that as seldom enter the sea. The land crabs (*Gegarcinas*) of Jamaica and the eastern Archipelago, exist many miles from the sea-shore, which they only visit to enable the young to free themselves from their egg-cases; marching in a huge phalanx many deep, they instinctively proceed to the nearest shore in a direct course and allow no obstacle to turn them aside from their path. For a short time the young live in the sea, but ultimately they quit it for the land and live in marshy districts where herbage is to be met with. A genus of East India (*Thelphusa*) has been noticed by Bishop Heber, in his 'Indian Journal,' to feed on grass and the young stalks of rice. The Deccan swarms with them; they burrow in the ground, whither they carry

their food in a bundle often as big as themselves. "It is amusing," he says, "to see the crabs sitting, as it were, upright, to cut their way with their sharp pincers, and then waddling off with their sheaf within holes, as quick as their sidelong pace will carry them." It appears absolutely necessary that they should dwell where moisture is abundant, in order that the branchial organs may have the surface kept damp, for they appear not otherwise to be endowed with the capability of absorbing the oxygen from the surrounding atmosphere.

The apparatus by which the oxygen is brought into contact with the blood consists of a series of very thin flat plates, laid side by side and strung together by the middle from the upper to the lower edges. Through the central column flows in, at the lower margin, the impure blood, which is returned again along the upper in an invigorated state, having in the meantime passed into the thin lateral plates, between which the water in marine and the air in terrestrial Crustacea passes; these plates are kept asunder by moisture and a peculiar apparatus that was first pointed out to me by Prof. Quekett. Each plate upon the upper margin has one or two small prominences, unimportant in each individual specimen, but in the aggregate the many form one or two considerable ridges traversing the entire column. Each branchia is an appendage to one of the limbs. The two anterior pairs of these limbs are in these crabs formed so as to be appendages immediately attendant upon the mouth; to one of these the branchial organs, instead of being developed into a true branchial column, is formed into a long flat lash, flexible and sweeping, arranged so as to overlie the branchiæ: this flabella has the edges fringed with long hairs, each of which is notched with many small teeth. The membrane lining the branchial vault is similarly furnished. The hairs upon the long flabella, as it sweeps the surface of the branches, hitch their teeth in the prominent ridges and separate each of the plates from contact with its neighbour, and thus facilitate the more perfect action of the fluids.

But as we descend from those in which the blood flows through canals adapted for the purpose, to others where it merely passes through channels between the muscles, we find that the organs adapted to aërate the blood is of a less complex character. In the Amphipoda and some of the Stomapoda they consist of a series of single chamber-cells, analogous in character to that of a single plate of the more perfect organ, and to which they bear a complete resemblance when in a larval condition.

In the Isopoda we have a broad demarcation. In all the previous

forms the branchial organs are developed upon the anterior portion of the animal (the pereion), which supports the true or walking legs. In the Isopoda they are formed beneath the pleon or posterior portion of the animal, where they are arranged in the form of a succession of leaflets, in corresponding pairs. It is a very curious circumstance, and one that must widely separate the order in which it exists from others. I have observed, in the early conditions, a strong pulsatory beat at the extremity of the tail of the larva of the prawn.

In the *Squilla* there are developed branches and complicated branchiæ attached to the pleopoda, but they differ much in form from those of the Isopoda; but, wherever situated, they have but a simple office to fulfil, the admission of oxygen through their thin walls to mix with the blood within.

We have often used the term blood, but Professor Agassiz has shown that the fluid that passes through the veins of animals lower than fish is not blood, that it wants a churning more in the vat of Nature to make it into true blood; and that the lower in the scale of animal existence it is found, the nearer in its nature is it to chyle, or the first character that the substance assumes after it has passed from that of digested food. Hence we can understand how it is that certain Crustacea change their colour, in accordance with that of the weed on which they live, being green where the *Ulvæ* grow, and anon they are purple where the red weeds are most abundant.

This circumstance offers in itself a means of protection from their numerous enemies, for, coloured like the weed, they creep about among the branches unobserved, and hide securely beneath the shadow of the leaves. In this way crawls about the long *Idotea*, whereas others hide beneath the stones, or build for themselves a secure abode.

The genus *Amphithoë* takes shelter in deep crevices between stones or at the roots of weed, there making use of stray bits of weed and small stones, which it cements by the aid of a fine thread-like substance (how secreted we cannot tell), twisted and twined in every possible direction. Binding the materials into a mass shapes it to a nest, beneath which it takes rest in peace. I have seen them, when freshly captured and put into a vase of water, take up a position upon a leaf of weed and curl it to a nest, cement the edges well together, leaving the ends open, and live securely there. But some are more ingenious still. The variegated *Podocerus*, that is plentifully to be found amongst the weed that attaches itself to large buoys, builds perfect nests in the branches of the zoophytes that are planted there. A

colony as thick as rooks are to be found ranged together ; there the little things sit and push out the head only, and with the long antennæ beat the water, keeping guard. These nests in their appearance bear no unstriking resemblance to that of many birds.

Others, again, change the style of their abodes ; instead of secreting threads they make use of mud and clay to perfect the walls, and then secrete a substance that forms a silky lining upon the internal surface. These abodes are generally long and tubular, open at each extremity, and although they are apparently of the diameter suited closely to fit the animal, yet they have the power to turn in their abodes. If annoyed at one extremity, they will turn round and push their heads out of the other. This abode is their place of refuge, and nothing will drive them out but the destruction of their homes. In this way lives the genus *Cerapus*, which Mr. Say tells us has the power of swimming about with its house on its back, and will crawl amongst the weed, still dragging it after ; not so its near ally, the *Siphonœcetus*, which anchors its tube to the branches of some zoophyte.

The habit in these lower forms brings to mind the instinct of the soldier crab, which secures for its convenience the cast-off shells of some mollusk. The species of this genus, when young, bear a near relation to the form of a young lobster. The body of the animal, which is soft and fleshy in the adult, is covered with the integument common to them, traces of which remain in patches even in the adult. During the earlier period the soldier crab swims the surface of the sea in fine weather, but when it grows a little older it seeks a shelter in some convenient shell. These generally they find dead, but sometimes they turn out the possessor, making an attack at some convenient moment, and probably "eat it out of house and home," in the truest meaning of the saying. They no doubt attack and devour mollusks, but the probability is that they do this for the sake of food, and not to obtain the shell in which to reside, but that afterwards, should they want a shell—and they often do change, "just for the fun of the thing"—they may take possession of the one that they had emptied. This statement, probably, holds more true of the older forms, which generally live in the shell of the common whelk, which generally outgrows its abode, so that it is not easy to draw itself into the shell, and therefore falls an easy prey to the burglar crab. Into the shell, when empty, the young crab gets, and, choosing one corresponding in dimensions, occupies it until it outgrows it ; then seeks a fresh and larger shell. We have been told how it rambles along the beach in search of a new habitation, and, having found it,

clanders from the old shell to the new, holding, like a cautious individual, by the old abode until it has been proved and found suitable. Should it be too small or otherwise rejected, the crab returns to its former shell and waddles away in search of another. I have frequently observed them in confinement, and have often tickled them out of the shell through a hole at the apex of the spine, for the purpose of seeing them get in again. The act baffles all description; it is so inimitably grotesque that it was always a wonder to me that they could do it themselves without laughing; but their gravity was half the fun. When one gets out of its shell it seems in a dreadful state of alarm; to say "it looks like a fish out of water" scarcely realizes the amount of its desire to get back again; it runs to the first shell it can get, puts its feet (not the claws) one upon each side of the shell and bounds in, vaulting much like an athletic youth will leap a gate, except that the crab throws its body between its legs,—an act the man cannot do, except some jugglers at a show. Sometimes, in its eagerness to get into a shell, it chooses one much too small; the shell covers perhaps but half its body. No matter; there it will remain, like an overgrown schoolboy with his coat too small, regardless of all criticism, until it finds a more suitable abode, which it loses no opportunity to obtain.

Sometimes the opposite extreme may occur, and the crab may find itself in a shell too large, one that it can scarcely manage. When the shell is on its back, the weight of the little fellow is not enough perhaps to toss it over; but in perseverance more than one animal of the lower forms in this respect is teacher to man: the little crab struggles and tries, gets its feet to touch the ground, and over comes the shell. Alas! it covers the animal entirely, but still the inconvenience is borne until a new tenement can be procured. I recollect once seeing a small crab, under these circumstances, get into a too big shell; it had not been there long before a larger crab approached. The little fellow, no doubt, feeling that it was not in its own abode, felt confident of trespassing, and then, like a self-convicted creature, sneaked in out of sight.

How often it is we find that individuals, in their efforts to avoid detection, exactly perform that which leads to their exposure! The big crab came up and felt the shell all over, twisted and turned it about, and found it to be the very one that was wanted. I could just see the smaller crab within watching for the intruder to go away; but it was not to be: the shell suited, so big crab jumped in! As the big one advanced within the shell the little one went further in,

retiring deeper and deeper as the big one got in ; but of course there must be an end to this ; there was a point at which the little crab could go no further. When it got to the end of the shell it stopped ; but still the big crab, perfectly unconscious of its neighbour, prepared finally to occupy the shell. It had scarcely got into the entire depth of the shell, when it came in contact with the small crab within, which immediately gave its soft tail a pinch. I shall never forget the hurry with which the larger one bounced out again—tear away ; it could not get out fast enough, with a strong expression on its countenance of unmitigated disgust and astonishment.

No doubt but many may think that to speak of the countenance of a crab is merely a figure of speech. Not so. The shepherd sees in the face of his sheep an expression peculiar to every one of his flock, and knows each by his features, with more certainty than a less observing man will recognize men in a crowd. So it is among the lower animals: the attentive observer will perceive an expression, in almost every one in a species, that marks its individuality ; and there can be little doubt but that there is as great diversity of appearance ; and character, though in a less striking degree, among the lower forms, as there is among the highest.

Both crabs looked out for a new abode, feeling assured that the old one was not “canny.” It not unfrequently happens that one will remain for a considerable time in the same shell, but it is in consequence of a sponge fixing itself upon the shell and growing over it: the sponge grows on and covers the shell, the presence of the crab alone preventing it from closing the mouth also. Through this orifice the crab passes in and out and runs about with its house, which looks like a moving mass of sponge.

Some of the *Macroura* (or long-tailed Crustacea) take up their abode deep in the mud or sand beneath the sea, into which they burrow for themselves galleries of very great length. There are among the amphipods some that have similar habits. The *Corophium longicorne* excavates its own way into hard clay or mud ; this, probably, is as much in search of food as to live in. They seek and hunt the worms that live there, waging a perpetual war against the whole tribe. A battle of serpents—a fight between man and beast—would not form half so terrific a *Laocoon* as a conflict between a *Corophium* and a fine nered worm, if you could only magnify their forms. The serpent is smooth, and can only bite ; the man or tiger has only claws and a mouth ; but the worm is armed with sharp daggers that dart out from its side the whole length of its structure ; and as for

a mouth, you never saw anything so horrible. It opens its lips and protrudes a tongue at first, but it becomes a proboscis-like thing when out, and at the extremity it opens wide, great, pointed, hook-like nippers fringed with teeth; these close upon their prey, and then withdraw deep within the gullet of the animal.

Then, beneath this fierce creature, a dragon, in the form of *Corophium*,—a creature with huge horns, as long or longer than itself; these have the power to rend and tear and lacerate its enemy, and withal strong; they reach far and drag him down to earth.

It is a frightful combat—that is, it would be, if the animals were large enough to suggest terror. But is size necessary to be terrific? To the worm that is to be devoured the tiny amphipod, or the sharp point of a fisherman's hook, is as fearful a thing as a huge mis-shapen monster or a Sepoy's knife would be to us. I am glad I am not a worm or anything so small, for certainly among the less of created beings Nature puts on a more terrific feature than can be found among the larger of her works!

There are other Crustacea that burrow; the *Chelura* among amphipods, and *Limnoria* among isopods, work their way into wood fixed beneath the sea, where they excavate small tunnels, mining and counter-mining each other, rapidly tearing away the timber in which they work, to the destruction of many a stately pile and overthrow of costly labour.

The *Chelura* is an animal of comparative recent discovery. It was first met with by Professor Phillippi at Trieste, and in this country at Dublin, and described by Professor Allman, in the 'Annals of Natural History' (vol. xix. pp. 367—8). It appears, from the size of the excavation that it makes, to be much more destructive, individually, than the *Limnoria*; but the latter is so much more abundant and its presence more general, that, in an economical point of view, as an evil, it is much more important.

C. SPENCE BATE.

(To be continued.)

On the Habits of a Chinese Myriapod.

By ARTHUR ADAMS, Esq., F.L.S.

IN many a sunshiny walk to the Bubbling Wells on the Pagoda my only and nearly constant companions have been the Mina birds and the poor worm whose peculiarities form the subject of this letter.

I am familiar with these two all the way there and back again, for the huge-bodied buffalo and the yelping dog, the oblique-eyed child or little-footed woman, are but casual road-side acquaintances.

The sky at this time of the year, and when the weather is fine, is of a pale clear blue, and the fields are fresh and emerald-green with the young wheat; the first swallow is a pleasing sight, and the quaint little children are spread over the landscape, for there are no hedges, filling small baskets with every esculent leaf and blade not sown by man. These are chiefly *Compositæ* and *Cruciferæ*, the knowing urchins carefully avoiding *Euphorbiacæ*.

Our myriapod crawls in every sunny path. Above, but not much above him, go the early *Andrænas*—for the other bees are not yet out—with steady zigzag flight, always diligently seeking something. The insect world is not yet fairly roused from its winter's sleep. A glittering black *Staphylinus* alights upon the path, or a dull *Aphodius* falls down before you; an adventurous land-crab makes an experimental trip from one hole to another on a sunny mud-bank; and the dykes are filled with little pellucid fish, with big heads and large golden eyes.

As for the *Mina* bird, he is everywhere. As you pass through the Settlement a loud cheery note salutes your ear, and, on looking about to thank the feathered vocalist, you see, perched upon the cornice of the tallest house, a *Mina*, solitary, but apparently on good terms with himself, and piping, at intervals, in the fulness of his joy. The old women are sitting in groups before their doors, busy with their spinning and their cotton-pods; and there, beside them, disputing the crumbs with the ducks and the fowls, is the *Mina* bird. Among the buffaloes in the marsh by the river's brink, familiar and noisy, the *Mina* birds gather in little flocks, perching on the heads and backs of their flat-horned, mud-covered companions, or refreshing themselves by making short excursions to the adjacent homesteads. From the bamboo and fir-tree plantations, which make the temples so picturesque, issue forth the clear, sweet notes of the *Mina*, mingled with the impudent "quirk, quirk" of the magpie, the harsh screech of the longtailed butcher-bird, the noisy chatter of the blue jay, and the familiar chirp of the homely sparrow.

And on every path where the sun is at his brightest crawls our myriapod, urging his way onward "with a heart for any fate." Like his brother worms with legs less numerous, he is supremely ignorant of the sayings and doings of the powers above; so he prefers the dry, sunny paths, instead of the scented bean-fields and the shelter of the

cotton plants; and gets crushed, in consequence, under the Juggernaut wheels of Chinese hand-barrows, or beneath the ponderous tread of labouring Coolie. Most of his consimilars are of retiring habits, love the seclusion of rotting logs, or seek the shelter of stones; but our familiar worm seems to love the sun. He encounters a great hulking spider, who jerks himself out of the way; he meets a little foraging patty of ants, and he goes without flinching through their serried ranks, or, if he cannot go through them, he marches over them; fissures, which to him must be frightful chasms, he boldly encounters; hillocks, in his eyes rugged mountains, he faces and surmounts with ease.

With unfailing energy he works his "myriad" legs, seeking in his progress—who knows what? To me, who have so often watched his wanderings, his object still seems purposeless: I have not fathomed the mystery of his life. Unheeded he passes by the charming bells of *Mazus pulchellus*, a pigmy beauty, whose blossoms nearly touch the earth; he pushes under bits of straw and withered blades of grass; he evades the fallen cotton-pods, the beards of barley and the awns of rice; he disregards the thistle-down and the feathered seeds that lie in his way; he will reject a putrid land-crab, and turn up his (metaphorical) nose at a dead snail; he inclines towards a crushed fungus, but on second thoughts is not partial to toadstools; he makes for a decayed fragment of wood, but he does not banquet on that. As he crawls he perpetually forms "lines of grace and beauty" by the lateral undulations of his mobile body. I have named him *Craspedosoma vagabunda*, a long name, and one which reminds me how a facetious critic in the 'Annals' found fault with some short names in the 'Genera of Recent Mollusca;' but I think any one, save our critic, will allow that *Aspa* is nearly as good as *Hispa*, and at least one syllable longer than *Ips*, *Trox*, *Cis*, *Blaps*, *Flos* and *Phos*.

This Chinese species is an inch in length, of a dark chestnut-brown, bright and shining, and may be known by the pale oblong tubercles on the sides of the body, one on each segment; by a transverse, minutely punctate groove in the middle of each segment; and by the hinder margins of the segments being finely beaded. The terminal or caudal segment is furnished with four short bristles. These characters will serve to distinguish it from the two European species of the genus already known.

ARTHUR ADAMS.

Shanghai, March, 1861.

List of Lepidoptera hitherto found within the Province of Moray, &c.; arranged according to Doubleday's 'List,' Second Edition. By the Rev. GEORGE GORDON, M.A.*

TEEMING with entomological information, as the pages of the 'Zoologist' have been since its commencement, there are to be found in them but few notices, in this department of Natural History, from the far North. The chief claim, then, which this list of the Lepidoptera of the province of Moray can present to the attention of the British entomologist arises from the latitude of the district to which it refers. Neither the number of species included in it, nor the rarity of any portion of them, would have merited a place in the pages of the 'Zoologist,' had this list been drawn up for any other part of our island that lay south of the Grampian range of mountains. Whatever interest or information this list may on other points convey, it will be held as a step towards ascertaining the northern range in Britain of several Lepidoptera hitherto not suspected of flourishing so near the arctic circle. Observers whose hunting-grounds lie in warmer latitudes will perhaps be surprised to learn that some of their favourite objects of pursuit have managed to cross the alpine heights of the Grampians; but, however this feat may have been accomplished, their surprise at these being captured in Moray will be somewhat moderated when they further learn that along the shores of the Firth wheat is the staple produce of the fields; that the barley of Moray and Easter Ross brings a high price in the London market; that nectarines, peaches and apricots ripen here on the open walls in ordinary seasons, and that even figs and sweet almonds are occasionally matured. From a table kindly drawn up by Dr. Geddes, H.E.I.C., it appears that the mean temperature at Elgin, for the six months April to September inclusive, is 53°1. This is the result of 4320 observations, made at 9 A.M. and 9 P.M., during the last six years, and on instruments kept entirely away from radiating influences, a position which should ever be chosen for registering thermometers in the North of Scotland, where in the course of a day the rays of the Midsummer sun come in from almost every point of the horizon. The annual average of rain for the same months and years has been 13·13 inches.

The province of Moray lies between the rivers Spey and Beaully, and is bounded on the south by the Northern Grampians, and on the north by the Moray Firth. Hence it forms the third subdivision

* In continuation of the Fauna of Moray (Zool. 4462).

("North-East Highlands") of "No. 15" in Mr. H. C. Watson's arrangement of provinces, as given in his recent 'Supplement' to the 'Cybele Britannica,' part first, page 48. Had this list been published in the 'Zoologist' before Messrs. Boyd and More had drawn up their paper on the geographical distribution of the Diurni (Zool. 6018), the addition of *Anthocharis Cardamines*, *Melitæa Artemis* and *Thanaos Tages* would have been made to the denizens of this, the fifteenth province of Britain.

The enumeration of the northern Scottish Lepidoptera, given in the late Dr. Macgillivray's work on Bræmar, does not unfold the richness of the ground in this section of Entomology, and no other record of a like nature, bearing upon any part of the region between the Grampians and Ultima Thule, has yet been published. To make this paper, therefore, as useful as the limits allowed will permit, and an entomological index of that part of Britain which lies north of the Grampians, or of a line drawn from Aberdeen to Fort William, other species, found in the east, west and north of the Province of Moray, are added within parentheses, together with some extra-provincial localities for a few of the rarer Moray denizens.

The compiler lays it before the readers of the 'Zoologist' as a continuation of his endeavours to illustrate the Natural History of his native province, and as the result of his own recent observations and of some of his friends in this untrodden district. Finding that the repetition of the names of local discoverers after so many species would occupy too much space, a hearty though general acknowledgment is here made to those who have, by their observations and generous contributions, helped to make this List reach its present size, however small it may be compared with others drawn up after a more lengthened study, and in more genial climes. Four terms—*viz.*, common, frequent, occasional and rare—are here used to mark the comparative occurrence of species; but future observations must of course cause the latter two to be supplanted by the former in many instances.

The confidence with which most of the species are given arises from the circumstance that specimens from this district passed under the eye of Mr. Logan, whose invaluable instruction is here gratefully recorded. Dr. Innes, of Forres, Mr. Martin, of the Elgin Institution, Mr. James Macdonald, of the Elgin Academy, Mr. William Gordon, formerly Schoolmaster of Advie (now of Birnie), Mr. John Macdonald, of Queen Street, Elgin, and Mr. Thomson, Free-Church Schoolmaster at Cawdor, have kindly transmitted whatever they have met with as

new or interesting in this or the other departments of provincial Natural History. The contributions of Mr. Grant, late of the Advie Post-Office (now in Australia), and of Mr. Thomas Bliss, of Darnaway, made in these rich localities of the North, have yielded many of the rarer species of this List; and it is owing to the persevering researches of Mr. W. C. Gellie, Cabinet-maker in Elgin, that *Argynnis Selene*, *Lithosia complana* and several *Geometræ* and *Noctuæ* have been detected in the province. Mr. Scott's list in the second volume of the 'Entomologist's Annual' is referred to by the word "Fochabers," and the species from Skye are noted either from specimens or a list furnished by Mr. J. Wingate, who has made many excellent discoveries in that island, seemingly a good locality, though little known to entomologists.

Pieris Brassicæ, *P. Rapæ* and *P. Napi*. All common.

Anthocharis Cardamines. Frequent. From Strathspey to the shores of the Firth; plentiful in the valleys of the upper districts, as Dallas, &c.

Argynnis Aglaia. Occasional. Strathspey; Darnaway; banks of the Findhorn. (Abundant in the north-western parts of Sutherland, *Mr. John Macdonald*).

A. Euphrosyne. Common.

A. Selene. Occasional. Knock of Alves, *Mr. W. Gellie*; Cawdor, *Mr. Thomson*.

Melitæa Artemis. Rare. Near Forres, *Dr. Innes*.

Vanessa Urticæ. Common.

V. Io. Rare. South College garden, Elgin, 1857, *Mr. John Macdonald*.

V. Atalanta. Frequent. Reaching as far inland as Strathspey; abundant, in the more cultivated districts, in 1857.

(*V. Cardui*. Found in Buchan, *Rev. Mr. Whyte*. Both Mr. John Macdonald and Mr. Thomson feel pretty confident that they have seen it; the former in 1859, between Newton and Burghead; the latter near Elgin, in 1860).

Erebia blandina. Frequent in the western parts of the province. The Cluny hills, at Forres, is the most easterly station where it has been as yet detected.

Satyrus Semele. Frequent. Hill of Birnie; Covesea, &c.

S. Janira. Common.

(*S. Hyperanthus* has been met with in the district of Buchan, Aberdeenshire, *Rev. J. Whyte*, and in Skye, *Mr. Wingate*).

Chortobius Davus. Rare. Falls of Glenlatterach ; (Skye).

C. Pamphilus. Common.

Thecla Rubi. Occasional. Mill of Birnie ; Shoggle ; Oakwood, near Elgin ; and Cawdor.

Polyommatus Phlæas. Frequent. Strathspey, &c., &c. (Our indefatigable and highly meritorious friend, Mr. Thomas Edward, states (Zool. 5824) that he saw in Banffshire what he considered a specimen of *P. Hippothoë*. It was not caught. We trust he will be more successful next start).

Lycæna Alexis. Common.

(*L. Agestis*, *var. Artaxerxes*, is found in Buchan. There is but one single patch of *Helianthemum vulgare*, on the shingle beaches near Oakenhead, known in the lower part of the province of Moray. This plant, however, is frequent in the upper districts, as in Badenoch, &c. : has the insect been found there ?).

L. Alsus. Occasional. Banks of the Lossie, at Birnie ; Knock of Alves ; Cawdor.

Thanaos Tages. Occasional. Birnie ; Covesea ; Cawdor ; ("Tain and Cromarty.")

Smerinthus Populi. Occasional.

Acherontia Atropos. Rare. Maviston, May, 1858, *Dr. Innes* ; larvæ found same year, in potato fields near Elgin ; another specimen from near Forres, in 1859, *Dr. Innes*. (Culmaily, Sutherlandshire, 1859, *Mr. P. P. Sellar.* ; Skye, *Mr. Wingate*).

Sphinx Convolvuli. Occasional. Almost every summer a specimen or more are met with ; in 1847 it was of frequent occurrence. At Ballindalloch, in 1860. *Convolvulus arvensis*, the reputed food of the larva of this *Sphinx*, is extremely rare in this district : some other plant must, to a certainty, afford nourishment to this insect in the early stage of its existence.

Macroglossa Stellatarum. Rare. In 1858 this species was met with in several localities, as at Advie, in Strathspey ; Birnie ; Glassgreen ; Manse of Duffus, &c.

M. Bombyliformis. Rare. One specimen, found several years ago in the manse garden at Duffus, was given to Mr. John Hancock, and is now believed to be in the Newcastle Museum. (Sutherlandshire, *Zool.* 4436).

Cossus ligniperda. Rare. Darnaway forest, *Mr. Thomas Bliss*, 1856 ; on diseased oaks at Brodie, 1857, *Dr. Innes*.

Hepialus hectus. Occasional. (Sutherland ; Skye).

H. lupulinus. Rare. Elgin, 1860, *Mr. John Macdonald*.

- (*H. sylvinus*. Skye, *Mr. Wingate*).
- H. Velleda*. Rare. Darnaway, *Mr. T. Bliss*; near Elgin, *Mr. Gellie*; (Sutherland; Skye, where *Mr. Wingate* also finds *var. carnus*).
- H. Humuli*. Frequent.
- Zygæna Filipendulæ*. Occasional. Sand-hills near Burghead, 1826; Duffus hillock, *Dr. Robertson*; Knock of Alves; Rothes, &c.
- Lithosia complana*. Rare. Elgin, *Mr. Gellie*.
- (*Euthemonia russula*. Skye, *Mr. Wingate*).
- Chelonia Plantaginis*. Occasional. Great numbers sporting one evening by a fir wood, hill of Birnie; ("Shetland," *Duncan*).
- C. caja*. Frequent, more so at villages near the sea.
- Arctia fuliginosa*. Frequent.
- (*A. lubricipeda*. Skye, *Mr. Wingate*).
- A. Menthastri*. Frequent.
- Orgyia fascelina*. Rare in Moray; (Sutherland, *Zool.* 4436).
- O. antiqua*. Occasional. Elgin, *Mr. Gellie*; (Banffshire, *Dr. Gordon*, of Clunie).
- Demas Coryli*. Rare. Kilnflat; (Skye).
- (*Trichiura Cratægi*. Skye, *Mr. Wingate*).
- Pœcilocampa Populi*. "Fochabers," *Mr. Scott* in *Ent. An.*
- (*Eriogaster lanestris*. Bennevis, *Zool.* 847).
- Bombyx Rubi*. Rare. Dunevan, *Mr. Thomson*; (Skye, *Mr. Wingate*).
- B. Callunæ*. Frequent on moors and in woodland.
- (*Odonestis potatoria*). Skye, *Mr. Wingate*; Sutherland, *Zool.* 4436).
- Endromis versicolor*. Rare. Two specimens of this beautiful species were caught in 1857, in the gardens of Brodie House, by *Mr. Sim*, the gardener; one of which will form part of the collection now being made up for the local department of the Elgin Museum.
- Saturnia Carpini*. Occasional. Birnie; Elgin; Advie; Forres, &c.
- Epione apiciaria*. Rare. Advie, Strathspey, *Mr. Grant*.
- Rumia cratægata*. Common.
- Metrocampa margaritata*. Occasional.
- Ellopia fasciaria*. Occasional. Mortlach; Knock of Alves; "Inverness," *Zool.* 400.
- Selenia illunaria*. Rare. Strathspey; Cawdor, *Mr. Thomson*.
- S. lunaria*. Rare. Near Elgin, *Mr. Gellie*.
- Odontopera bidentata*. Frequent.
- Crocallis elinguaris*. Occasional. Birnie; Elgin.
- Himera pennaria*. Rare. Birnie, October, 1857; (Skye).

- (*Nyssia zonaria*. Skye, *Zool.* 1006).
Amphydasis betularia. Occasional. "Fochabers;" Elgin.
Boarmia repandata. Frequent.
(*Tephrosia crepuscularia*. Sutherland, *Zool.* 4436).
Gnophos obscurata. Rare. Near Elgin, *Mr. Gellie*; (Skye).
Dasydia obfuscata. Rare. (Sutherland, *Zool.* 5556).
Geometra papilionaria. Rare. Oakwood, at Elgin; Altyre.
Ephyra punctaria. Occasional. Elgin; Cawdor.
(*E. pendularia*. Sutherland, *Zool.* 4436).
(*Venusia cambricaria*. Bennevis, *Zool.* 847).
Acidalia bisetata. Rare.
A. remutata. Occasional.
A. aversata. Occasional.
Timandra amataria. Rare. Cawdor, *Mr. Thomson*.
Cabera pusaria. Frequent.
C. exanthemaria. Occasional.
Macaria liturata. Occasional.
(*M. notata*. Aberdeenshire, *Mr. Thomson*).
Halia wavaria. Occasional.
Numeria pulveraria. Occasional. Birnie; Cawdor; (Skye).
Scodiona belgiaria. Occasional. (Sutherland, *Zool.* 4436).
Fidonia atomaria. Common.
F. piniaria. Common.
(*Aspilates citraria*. Skye, *Mr. Wingate*).
Abraxas grossulariata. Frequent.
(*Lomaspilis marginata*. Skye, *Mr. Wingate*).
Cheimatobia brumata. Occasional.
Oporabia dilutata. Occasional. Birnie; Aldroughty.
O. filigrammaria. Rare.
Larentia didymata. Frequent.
L. multistrigaria. Occasional.
L. cæsiata. Occasional.
(*L. ruficinctata*. Sutherland, *Zool.* 847).
(*L. salicata*. Bennevis, *Zool.* 847; Skye).
L. olivata. Occasional.
L. pectinitaria. Frequent.
Emmelesia alchemillata. Common.
(*E. albulata*. Skye, *Mr. Wingate*; Aberdeen, *Zool.* 2401).
(*E. affinitata*. Skye, *Mr. Wingate*).
(*E. ericetata*. Sutherland, *Zool.* 847; Skye).
(*E. blandiata*. Bennevis, *Zool.* 847; Skye, *Mr. Wingate*).

- Eupithecia succenturiata*. Occasional.
E. helveticaria. Rare. Cawdor, *Mr. Thomson*.
 (*E. satyrata*. Sutherlandshire, *Zool.* 4436).
E. castigata. Rare. Cawdor, *Mr. Thomson*.
 (*E. constrictata*. Skye).
 (*E. nanata*. Skye).
E. vulgata. Common.
E. absynthiata. Occasional.
E. minutata. Occasional.
E. assimilata. Occasional.
E. rectangulata. Occasional.
Lobophora lobulata. Occasional.
 (*L. hexapterata*. Sutherland, *Zool.* 4436).
Thera simulata, *T. coniferata* of Curtis. Fort Augustus, *Zool.* 4436.
T. variata. Occasional.
Ypsipetes impluviata. Rare. Near Elgin, *Mr. Gellie*.
Y. elutata. Frequent.
Melanthia ocellata. Frequent.
 (*Melanippe hastata*. Skye, *Mr. Wingate*).
 (*M. tristata*. Bennevis, *Zool.* 847).
M. subtristata. Common.
M. montanata. Common.
M. fluctuata. Common.
Anticlea badiata. Occasional.
A. derivata. Occasional.
Coremia munitata. Common.
C. propugnata. Rare. Dufftown, *Mr. James Smart*; (Skye).
C. ferrugata. Rare. Near Elgin, *Mr. Gellie*.
Camptogramma bilineata. Common.
 (*Phibalapteryx lignata*. Aberdeen, *Zool.* 2401).
Cidaria psittacata. Common.
C. miata. Occasional.
 (*C. corylata*. Skye).
C. russata. Occasional in Moray; (Skye).
C. immanata. Common.
C. suffumata. Occasional.
C. prunata. Common.
C. testata. Common.
C. populata. Occasional. Glenfiddach; Birnie; "Inverness,"
Zool. 400.
C. fulvata. Occasional.

- (*C. silaceata* and *C. pyraliata*. Skye, *Mr. Wingate*).
- Eubolia palumbaria*. Occasional.
- (*E. mensuraria*. Sutherland, *Zool.* 5556; Skye, *Mr. Wingate*).
- Carsia imbutata*. "Dalwhinnie moor," *Zool.* 400; (Skye).
- Anaitis plagiata*. Rare. Wood near Scaat-craig.
- Chesias spartiata*. Occasional. Manbean, Sept. 1857.
- C. obliquaria*. Occasional. Birnie; Cawdor.
- Tanagra chærophyllata*. Occasional. (Banffshire, *Dr. Gordon*.)
- (*Platypteryx lacertula*. Sutherland, *Zool.* 4436; Skye).
- (*P. falcula*. Sutherland, *Zool.* 4436).
- Dicranura furcula*. Rare. Near Elgin, *Mr. Gellie*; (Banff, *Rev. W. Grigor*; Skye, *Mr. Wingate*).
- D. vinula*. Occasional.
- Pygæra bucephala*. Occasional. Birnie; Forres; (Skye).
- (*Clostera reclusa*. Skye, *Mr. Wingate*; Bennevis, *Zool.* 486).
- Notodonta camelina*. Rare. Elgin, *Mr. Gellie*; (Skye).
- N. carmelita*. Rare. Oakwood near Elgin, *Mr. Gellie*.
- N. dictæa*. Rare. Elgin, *Mr. John Macdonald* and *Mr. Gellie*.
- N. dromedarius*. Rare. Ladies' Walk, Elgin, *Mr. Gellie*.
- (*N. ziczac*. "Fort William," *Zool.* 487; Skye, *Mr. Wingate*).
- Thyatira Batis*. Rare. Birnie, 1857; Oakwood, *Mr. Gellie*.
- Cymatophora duplaris*. Rare. Birnie; (Sutherland, *Zool.* 4436; Ross-shire, *Zool.* 847).
- C. flavicornis*. "Fochabers," *Ent. An.* for 1856.
- Acronycta Psi*. Occasional. Slotfield; Cawdor; (Skye).
- A. leporina*. Rare. Deanshaugh, Elgin, *Mr. Gellie*.
- A. Ligustri*. Rare. Palmercross, Elgin, *Mr. Gellie*.
- A. Rumicis*. Occasional. (Skye).
- (*A. Menyanthidis*. Skye, *Mr. Wingate*).
- A. Myricæ*. Rare. Falls of the Lossie.
- Leucania conigera*. Occasional. Birnie; Drainie, *Rev. J. Weir*.
- L. lithargyria*. Rare. Near Elgin, *Mr. Gellie*.
- L. impura*. Frequent.
- L. pallens*. Common.
- (*Nonagria fulva*. Skye, *Mr. Wingate*).
- Hydræcia nictitans*. Rare. Birnie, 1858; (Skye).
- H. micacea*. Frequent. At Climatis, 1857.
- (*Axylia putris*. Skye).
- Xylophasia rurea*. Common.
- X. polyodon*. Common.
- (*Heliophobus popularis*. Aberdeen, *Macgillivray's 'Bræmar.'*)

- Charæas Graminis. Frequent.
 Luperina testacea. Occasional. Elgin, *Mr. Martin*; Darnaway,
Mr. Bliss.
 Mamestra furva. Rare. Elgin, *Mr. Gellie*.
 M. Brassicæ. Common.
 Apamea basilinea. Common,
 A. gemina. Common.
 A. oculea. Common.
 (Miana strigilis. Skye).
 M. fasciuncula. Occasional. Mortlach, *Mr. James Smart*.
 Caradrina cubicularis. Common.
 Rusina tenebrosa. Occasional.
 Agrotis valligera. Rare: Lesmurdie Cottage, *Mr. Gellie*.
 A. Segetum. Rare.
 A. lunigera. Occasional.
 A. exclamationis. Frequent.
 A. corticea. Rare. Birnie.
 A. cursoria. Rare.
 A. nigricans. Rare. Near Elgin, *Mr. Gellie*.
 A. Tritici. Occasional. Elgin and Main, *Mr. Gellie*.
 A. agathina. "Fochabers."
 A. porphyrea. Occasional. (Skye, *Mr. Wingate*).
 A. præcox. "Fochabers."
 A. pyrophila. Occasional.
 Triphæna ianthina. Common.
 T. fimbria. Rare. Elgin Institution, *Mr. Martin*; (Banffshire;
 Skye).
 T. orbona. Frequent. Dark variety, occasional.
 T. pronuba. Occasional.
 Noctua glareosa. Rare. Elgin, *Mr. Gellie*; (Skye, *Mr. Wingate*).
 N. depuncta. Rare. Dufftown, *Mr. James Smart*; Elgin; "Fo-
 chabers."
 N. augur. Common.
 N. plecta. Occasional. Birnie; Scroggie Mill; Cawdor.
 N. C-nigrum. Common.
 N. brunnea. Occasional.
 N. festiva. Occasional.
 N. Rubi. Frequent.
 N. umbrosa. Occasional.
 N. baja. Occasional. Birnie; Elgin; Drainie.
 N. xanthographa. Common.

- Trachea piniperda. Occasional. Birnie, 1858; "Fochabers;"
Cawdor.
- Tæniocampa gothica. Frequent.
- T. rubricosa. Rare.
- T. instabilis. Rare. Main, *Mr. Gellie*.
- T. stabilis. Rare. Elgin, *Mr. Gellie*.
- Anchocelis litura. Rare. Birnie, 1858; Elgin, *Mr. Gellie*.
- Cerastis Vaccinii. Rare. Oakwood, near Elgin, *Mr. Gellie*;
(Skye).
- Scopelosoma satellitia. Rare. Bræmorrison, *Mr. Gellie*.
- Xanthia cerago. Frequent.
- X. silago. Rare. Birnie; Bræmorrison, *Mr. Gellie*.
- X. ferruginea. Occasional. Birnie; Brodie; Bræmorrison.
- Cosmia trapezina. Rare. Elgin, *Mr. Gellie*; (Skye).
- Dianthæcia Cucubali. Rare. Mill of Birnie; (Skye).
- Polia Chi. Occasional.
- Epunda lutulenta. Rare.
- E. nigra. Frequent.
- Miselia Oxyacanthæ. Occasional.
- Agriopsis aprilina. Rare. Oakwood, Elgin, *Mr. Gellie*.
- Phlogophora meticulosa. Occasional.
- Euplexia lucipara. Occasional.
- (Aplecta occulta. Tain, *Mr. Weaver*, Zool. 5556).
- A. nebulosa. Occasional.
- Hadena adusta. Occasional.
- H. glauca. Rare. Near Birnie.
- H. dentina. Common.
- H. oleracea. Common.
- H. thalassina. Common.
- H. rectilinea. Rare. Bilboahall, *Mr. Gellie*; (Sutherland, Zool.
4436).
- Calocampa vetusta. Rare. Birnie; (Tain, Zool. 5556; Skye).
- C. exoleta. Occasional. Birnie; Advie.
- (Cucullia umbratica. Skye, *Mr. Wingate*).
- Anarta cordigera. Rare. Knock Frink, Strathspey, *Mr. W. Gordon*.
- A. Myrtili. Occasional. Moorish ground at Birnie; Elgin, *Mr. Gellie*.
- (Erastria fuscula. Dingwall, Zool. 847).
- Brephos Parthenias. Rare. Wood at Altyre, April, 1857.
- Abrostola Urticæ. Common.
- Plusia chrysitis. Occasional.

P. bractea. Rare. Near Birnie, 1855, *Mr. W. Gordon*; (Skye).

P. Festucæ. Rare. Birnie; Oakwood, Elgin, *Mr. Gellie*.

(*P. Iota*. Skye, *Mr. Wingate*).

P. V-aureum. Occasional. Kellas; St. Andrews; &c.

P. Gamma. Common.

(*P. interrogationis*. Sutherland, *Zool.* 847, 5556).

Gonoptera *Libatrix*. Occasional. Birnie; Aberlour.

Amphipyra Tragopogonis. Common.

Mania typica. Occasional. Darnaway; Drainie; &c.

(*Stilbia anomala*. Bennevis, *Zool.* 400; Sutherland, *Zool.* 847).

(*Euclidia Mi.* Aberdeen, *Zool.* 2401).

Phytometra ænea. Occasional. Shoggleburn, near the fall.

Within the province of Moray so little attention has been paid to the remaining tribes of Lepidoptera, that it will be doing ample justice here simply to enumerate, *in cumulo*, the few species that have as yet been detected in a field which, judging from the preceding part of this paper, must be prolific also in Micro-Lepidoptera. "F." marks those found by Mr. Scott about Fochabers, and published in the 'Entomologist's Annual,' vol. ii. The species within parentheses have not yet been found in the province of Moray; "E." "W." and "N." indicating that the locality on this side of the Grampians lies to the east, west or north of Moray. Notices given by Mr. Buxton and others (*Zool.* 847, 2401, 4436, 5556) are here quoted for the localities of several species.

Hypena proboscidalis.

Aglossa pinguinalis. *Ennychia cingulalis*; (*E. octomaculalis*, *W.*) *Hydrocampa nymphæalis*, *F.* *Botys fuscalis*. *Pionea forficalis*. (*Scopula alpinalis*, *W.*); *S. lutealis*; (*S. decrepitalis*, *N.*) *Scoparia muralis*; *S. lineolalis*.

Crambus pratellus; (*C. ericellus*, *N.*); (*C. margaritellus*, *W.*); *C. pinetellus*; *C. tristellus*; *C. culmellus*; *C. hortuellus*. (*Phycis abietella*, *W.*) *Melia sociella*.

Halias prasinana, near Elgin, *Mr. G. Christie*. *Tortrix ribeana*; *T. unifasciana*; (*T. viburnana*, *E.*, *W.* and *N.*); *T. ministrana*; *T. adjunctana*. (*Peronea favillaceana*, *W.*); (*P. rufana*, *N.*); *P. mixtana*; (*P. Schalleriana*, *W.*); (*P. caledoniana*, *F.*); *P. variegana*; (*P. ferrugana*, *N.*); (*P. tristana*, *W.*) *Teras contaminana*. (*Penthina prælongana*, *N.*); *P. cynosbana*. (*Pardia tripunctana*, *W.*) (*Sericoris*

cespitana, E.); *S. lacunana*; (*S. micana*, E. and N.) *Mixodia palustrana*, F. (*Cnephasia lepidana* and *C. musculana*, N.) (*Sciaphila octomaculana*, W.) (*Phoxopteryx unguicana*, *P. biarcuana*, *P. myrtillana*, *P. lundana* and *P. ramana*, N.) *Ephippiphora* Brunnichiana. (*Coccyx argyrana*, N.) *Retinia resinana*, F.; *R. duplana*, F. (*Dicro-rampha senectana* and *D. simpliciana*, E.) (*Pyrodes rhediana*, E.) *Eupœcilia angustana*; (*E. ruficiliana*, N.) (*Argyrolepis badiana*, E.) (*Cochylis stramineana*, E.) (*Aphelia pratana*, W.)

(*Epigraphia Steinkellneriella*, N.) *Tinea tapetzella*. (*Lampronia prælatella*, N.) (*Incurvaria Zinckenella*, N.); (*I. Cehlmanniella*, N.) (*Micropteryx calthella* and *M. allionella*, N.) *M. purpurella*, *M. unimaculella*, *M. Sparmanella* and *M. subpurpurella*, F. *Nemophora Swammerdammella*; (*N. Schwarziiella*, N.) (*Adela cuprella*, N.) (*Swammerdamia cæsiella*, N.) (*Pepilla Curtisella*, E.) *Plutella xylostella*, most abundant on turnips, in 1851. *Depressaria costosella*, *D. umbellella*, *D. arenella*, *D. applanella*. (*Gelechia longicornella*, N.) (*G. proximella*, N.) *G. Hübnerella*; *G. instabilella*. *Pleurota bicostella*. *Endrosis fenestrella*. (*Röslerstammia Erxlebelliella*, N.) (*R. pronubella*, N.) *Tinagma resplendella*. *Argyresthia conjugella*. *Gracilaria semifasciella*, N.); *G. elongella*, F.; *G. fringipennella*, F. *Coriscium citrinella*, F. (*Ornix Loganella*, N.) *Coleophora viminetella*, F. *Chauliodus chærophyllella*, F. *Chrysoclista Schrankella*, F. (*Chrysocoris festaliella*, N.) *Elachista kilmunella* and *E. zonnariella*, F. *Lithocolletis vacciniella*, *L. Frolichiella*, *L. Dunningiella*, *L. stettinella* and *L. Klemannella*, F.; (*L. caledoniella*, N.) *Semiostoma spartifoliella*. (*Bucculatrix Demaryella*, N.)

(*Pterophorus acanthodactylus*, N.) *Alucita polydactyla*.

This list is deficient in due proportion of marsh or fen species; there are, however, promising localities in the province of Moray, which, if well searched, would supply the deficiency. Not a single capture is here recorded from the Loch of Spynie, whose wide-spreading borders, studded with a variety of aquatic plants, must contain many Lepidoptera peculiar to such situations. The peaks and fastnesses of the sub-alpine heights of the province, and the deep recesses of its woods, have been almost unvisited by the entomologist. To show that there is still much to be done, even among the Macro-Lepidoptera of the North of Scotland, it need only be stated that from this, the fullest list yet published, there are absent upwards of twenty species, each of whose localities Mr. Stainton, in his 'Manual,' characterizes by the expression "everywhere."

Two excellent papers were published in the 'Naturalist,' in 1851 and 1852, *viz.*, 'Notes on the Lepidoptera of the West of Scotland and of Fifeshire,' by Mr. J. Gray, and 'The Lepidopterous Insects of Midlothian,' by Messrs. Lowe and Logan. They afford good materials for comparison with the contents of the present paper. Mr. Gray's ground forms almost a band, sweeping from sea to sea, south of the Grampians; and its species may be laid alongside those here enumerated, and which occur in a similar band, but north of the same mountain range, from Skye to Aberdeen. Messrs. Lowe and Logan's paper is confined to Midlothian; and as both are districts on the east coast of the island, its species may be compared with those found within the province of Moray. Hence the following table is constructed, in which "N.G." represents North of Scotland, "W.F." West of Scotland and Fifeshire, "M." province of Moray, "Mid" Midlothian, and "C." common to both.

	N.G.	W.F.	C.	M.	Mid.	C.
Diurni - - -	23	25	20	20	25	15
Nocturni - - -	32	29	20	24	31	18
Geometræ - - -	97	81	64	75	103	63
Drepanulæ - - -	2	1	1	0	1	0
Pseudo-Bombyces	9	9	8	7	8	6
Noctuæ - - -	106	92	76	95	118	80
Deltoides - - -	1	1	1	1	1	1
Pyralides - - -	12	9	6	8	18	7
	—	—	—	—	—	—
	282	247	196	230	305	190

The constant change of nomenclature which this department of natural science so grievously suffers, makes it difficult, in some instances, while comparing different faunas, to ascertain the synonym. The numbers, then, in this table may not be absolutely correct. Mr. Logan has favoured me with the Midlothian additions; but ten years have passed since Mr. Gray's paper here used was published, and the fauna of the district he then reported on has doubtless in the interim been found to contain other species, as every season continues to yield fresh numbers to the already known lepidopterous denizens of the North of Scotland.

In this paper errors and omissions must exist. It is hoped that the readers of the 'Zoologist' will kindly supply notes of correction, and that such of them as cross the Grampians, armed with net and box, will, through its pages, make known the prizes they have the fortune to secure.

G. GORDON.

Scarcity of Sesia Muscæformis in 1861.—I have taken a trip to look after *Sesia Muscæformis*, but the wind and rain prevented my obtaining any in good condition, Although I worked hard for two or three weeks I only obtained two specimens.—*George King; Union Street, Torquay, July 16, 1861.*

[Mr. Doubleday, with his customary care to obtain the correct name of every new British Lepidopteron, sent specimens of this species to M. Guenée, who pronounces them to be *Sesia Muscæformis* [of his cabinet, and *not* *S. Philanthiformis*, which he also possesses, and which is a different species. In any list hereafter published by M. Guenée or Mr. Doubleday Mr. King's insect will therefore stand as *Sesia Muscæformis*. I fear I was the author of the original mistake in naming this insect, having supposed *Philanthiformis* and *Muscæformis* to be merely synonyms of the same insect. Mr. Reading in his learned paper (*Zool.* 7280) has adopted this unfortunate error.—*Edward Newman.*]

Further Note on the Supposed New Irish Zygæna.—Of course my note in a late number of the 'Zoologist' (*Zool.* 7565) has produced many communications on the same subject, the most interesting of which are, first, a letter from M. Guenée, addressed to Mr. Doubleday, and, secondly, a visit from Mr. Birchall. From M. Guenée's letter it appears manifest that that greatest of Lepidopterists considers that the two Irish *Zygæna* are distinct as species; the one which we have so long known by the name of *Minos*, and which is particularly distinguished by its black woolly or hairy body, he believes to be undescribed; and the comparatively recent addition to our fauna, which I announced in the June number, he regards as the true *Zygæna Minos*. This view of the case is corroborated by a most careful comparison of a pair of continental specimens of *Zygæna Minos*, sent over by Herrich-Schæffer, with the insects taken in Ireland, and one of which I had supposed to be *Z. Achilleæ*. The continental specimens have been kindly presented to the cabinet of the Entomological Club by Mr. Birchall, and have been placed side by side with others of his own taking. A pair of continental *Zygæna*, presented by Mr. Doubleday to Mr. Birchall, were at the same time submitted to a like critical examination, with the result that one of them was certainly identical both with Herrich-Schæffer's *Z. Minos* and with Mr. Birchall's new Irish insect; the second specimen, however, seemed to differ, being a much more opaque insect, somewhat larger, irrorated with testaceous scales, and having a whitish or grayish tuft on each side of the mesothorax at the base of the fore wings, extending on to the wing itself. These differences at first induced both Mr. Birchall and myself to think that the two specimens in question were referrible to different species, the one probably being the true *Z. Minos*, the other the true *Z. Achilleæ*, but even this conclusion appears doubtful, since we found the testaceous scales often present in the Irish specimens, and in a few instances the gray tuft at the base of the fore wings is also very distinctly present. Under these circumstances it seems best to eliminate the name of *L. Achilleæ* from the discussion, and to confine our attention to the two species, or supposed species, which I endeavoured to differentiate at page 7565. Let us call the most familiar black-bodied insect *Zygæna nubigena*, thus adopting a cabinet name used both in France and Germany, and one which M. Guenée proposes to adopt should he ever describe this tribe of insects. And let us inquire how it came to be called *Z. Minos* in England, and in England only. The first notice of the insect is from my own pen, and runs thus:—"I am informed by my friend Mr. Thomas H. Allis that about a dozen specimens of *Zygæna Minos* were taken last summer on the west coast of Ireland by Henry Milner, Esq., of Nunappleton, near York."—*Zool.* 4180, dated January,

1854. Mr. Stevcs (Zool. 4272) is reported to have exhibited at the Entomological Society's Meeting specimens of the new British *Zygæna Minos*. At Zool. 4436 is a most interesting paper by Mr. A. G. More on the geographical distribution of *Zygæna Minos* in the West of Ireland. Such were the earliest notices of this insect, all adopting, without hesitation, a name for which no authority had then been given. Latterly Mr. Doubleday places it in his Synonymic List as *Z. Minos*, *W. V.* The Vienna Catalogue is certainly high authority when we know what is intended, but, alas! in this, as in too many other instances, it is now too late to inquire what its learned authors meant by the name. It will not, I think, be urged by Mr. Allis, with whom the name as applied to the Irish insect seems to have originated, that he ever went into the question of its nomenclature very critically. Let me now attempt to bestow on it a name which, even if not accepted, will at any rate challenge inquiry and discussion.

ZYGÆNA NUBIGENA, Musæorum.

Alæ anticæ semihyalinæ, nigrescentes, plaga magna difformi discali rubro; alæ posticæ rubræ margine tenuiter nigro: caput, thorax, et abdomen nigra, opaca, hirsuta.

The amount and disposition of the red colouring on the fore wings of the species of *Zygæna* has always been held of great importance in differentiating species; thus the terms "five-spot" and "six-spot" describe characters which in this country were for sixty years considered amply sufficient to distinguish our indigenous species. Although this is no longer the case, we may still consult these markings with advantage. In the two supposed species I am now considering the red area of the fore wings is divided by the wing-rays into three portions or blotches: the first blotch may be called *costal*; it originates at the base of the wing, and extends immediately beneath the costal margin; the second may be called *discal*, occupying, but not limited by, what is usually termed the discoidal cell; the third may be called the *inferior* blotch; it originates at the base of the wing, and extends towards the hind margin. The costal blotch is pointed at its distal extremity, and the discal blotch at its basal extremity. Mr. Birchall has pointed out to me that in the continental specimens of *Z. Minos*, these two points do not pass or overlook each other, whereas in *Z. nubigena* the passing or overlapping is most evident. In a letter from Mr. N. Cooke, of Liverpool, to Mr. Doubleday, this character is clearly shown by coloured sketches. This difference, I admit, appears very insignificant, but supposing that one form of blotching is constant to the black-bodied individuals, and the other form of blotching constant in the green-bodied individuals, it will aid us very materially in our attempts to establish the existence of two species. In addition I have only to say that I shall be much obliged for any information respecting the *Z. Minos* said to have been found both on the West and East Coasts of Scotland. I have seen neither.—*Edward Newman.*

Description of the Larva of Acidalia rusticata.—Falls off its food-plant, feigning death and remaining in a looped position when disturbed. Head rather small, very distinctly exerted: body having each segment divided into eight rings, these rings composed of minute warts, and these warts again emitting clavate or rather capitate bristles, so that the entire surface is rough, having the appearance and character of shagreen. Head nearly black: body brown, of two shades, rather prettily variegated. Feeds on *Cratægus Oxyacantha* (whitethorn), and is full fed by the end of May, when it spins a slight web among the leaves of its food-plant and changes to

a pupa. The perfect insect appears in July. I am indebted for these very curious larvæ, as well as the following, to Mr. D. T. Button, who bred them from the egg.—*Edward Newman.*

Description of the Larva of Acidalia inornata.—Rests in a straight posture; does not fall off its food when touched. Head prone: body flattened, dilated at the sides; segments well defined, and each divided by transverse furrows into eight rings; these rings in the 2nd, 3rd, 4th, 9th and following segments are composed of warts, which emit short stumpy bristles. Colour red-brown, with little variation of shade, but having a whitish median spot on the back of the 6th and 7th segments. Feeds on *Salix Russelliana* (Bedford willow), and is full fed on the 30th of May, when it spins a slight web among the willow leaves, and therein changes to a pupa. The moth appeared on the 24th of June.—*Id.*

Description of the Larva of Corycia taminata.—Larva naked. Head and body green or purplish brown; a broad, purplish dorsal stripe, edged with white; spiracular line white; spiracles black; a narrow white band encircles the border at the junction of each segment. Feeds on wild cherry.—*B. H. Birks (in the 'Intelligencer');* *Stonor, Henley-on-Thames.*

Description of the Larva of Halia Wavaria.—Rests in a nearly straight posture, but with the head erected and porrected. When disturbed falls from its food bent double, and feigns death, remaining a long time perfectly without motion. Body slightly dilated at the sides, otherwise uniformly cylindrical: head lead-coloured, with black markings, the disposition of which differ in different individuals: back varies from an obscure apple-green colour to a decided lead colour, scarcely two individuals being precisely similar in hue, but all are longitudinally marked with approximate, waved, interrupted smoke-coloured lines; belly nearly coloured like the back; sides having each segment adorned with an amorphous canary-coloured blotch, which blotches give the appearance of a lateral yellow stripe. On all parts of the body are shining black warts, each of which emits from the summit a single black bristle; four of these warts are arranged in a transverse series on the back of the 2nd, 3rd and 4th segments, and four in a square on the back of the 5th and following segments, and three in each canary-coloured mark on the sides form a triangle, which comprises the spiracles; other similar bristle-emitting warts occur beneath: legs intensely black; claspers lead-coloured. Feeds on *Ribes grossularia* (common gooseberry), which it strips of its leaves much in the same manner as the gooseberry grub, a species of sawfly, with which it is often confounded. It is full fed by the third week in June, when it spins a slight web among the gooseberry leaves. The perfect moths appear on the wing throughout July.—*Edward Newman.*

Description of the Larva of Aspilates strigillaria.—Rests in nearly a straight posture, but falls from its food, tucks in its head and feigns death when touched or disturbed. Head rather porrected, simple, not divided on the crown, rather less in circumference than the body: body uniformly cylindrical, emitting here and there throughout its length short black bristles; it has two small dorsal warts on the 8th segment, two larger and nipple-shaped humps on the 9th segment, and two still smaller excrescences on the 10th segment, besides many other minute warts on different parts of the body; on the 13th segment, immediately above the anal claspers, and below the anal aperture, are two short points or processes directed backwards. The colours are very obscure, gray-brown of different shades, producing a somewhat mottled appearance, and the lighter colour assuming the form of narrow longitudinal stripes. The egg is laid in

summer or autumn on *Calluna vulgaris* (common ling), and the young larva hibernates. It feeds again throughout the month of April, and is full fed early in May. It then spins a slight web among the twigs of its food-plant, and therein changes to a pupa. The moth appears about the 18th of June. I am indebted to Mr. Thomas Hockett for this and the following larva.—*Edward Newman*.

Description of the Larva of Hybernica defoliaria.—Rests in a curved position; does not tuck in its head, feign death, or fall off its food-plant when disturbed; head rather large, not notched on the crown; body uniformly cylindrical, without humps. Head without gloss, brown: body with a broad dorsal area of a clear brown colour; this area is bounded on each side by a very distinct but narrow, wavy, black stripe, and is also adorned with gray markings, which are particularly conspicuous at the interstices of the segments where these approach the black boundary stripe; below the boundary stripe the body is bright yellow; the spiracles are white, and the region surrounding each spiracle brown; belly greenish yellow; legs and claspers pale. A beautiful but very abundant larva: it feeds on *Corylus avellana* (hazel), *Cratægus Oxyacantha* (whitethorn), *Quercus Robur* (oak), and many other trees, and is full fed at the middle of June, when it changes to a pupa on the surface of the earth. The moth appears in October.—*Id.*

Description of the Larva of Eupithecia dodoneata.—*Var. 1.* Ground colour ochreous-red. Central dorsal line very dusky olive, almost black, interrupted. Down the centre of back a series of blackish or dusky olive arrow-shaped blotches, reduced in size on the posterior, and merged in the central line on the anterior segments. Subdorsal lines slender, dusky, bordered with dull yellow. Spiracular line alternating between dull yellow and dusky olive. Between subdorsal and spiracular lines a row of slanting bright yellow stripes, interspersed with dusky blotches. Segmental divisions orange-red. Body thickly studded with minute white tubercles, and thinly clothed with whitish hairs. In appearance strongly resembles the larva of *Eupithecia virgaureata*.

Var. 2. Ground colour pale yellowish green. Central dorsal line and blotches similar to those of var. 1, but much paler olive. Spiracular line, segmental divisions and lateral stripes greenish yellow.

Var. 3. Ground colour orange-red. Back tinged and suffused with dull yellowish green. Dorsal blotches wanting. Central dorsal line reddish brown or olive, enlarged in the centre of each median segment. Subdorsal lines same colour, slender. Spiracular line and lateral stripes greenish yellow, the latter indistinct. Strongly resembles the larva of *Eupithecia abbreviata*. The larvæ from which the above description was taken were reared from eggs kindly sent me by Mr. M'Lachlan, of Forest Hill. They fed on oak, from which tree I have been in the habit of occasionally beating the larvæ for some years past. I have no doubt that it also feeds on whitethorn, as my friend Mr. Greene has frequently taken the pupa under the bark of this tree, at some distance from any oaks. It is a very delicate larva. Almost all mine, this summer, died when full fed. They seemed to prefer the youngest and most succulent oak leaves, and I principally attribute their death to the difficulty of finding a constant fresh supply of newly-expanded foliage. Pupa either enclosed in a slight earthen cocoon or under bark; dark dusky red; upper edge of wing-cases brighter red than the rest of the pupa: has a rough, wrinkled appearance. Perfect insect appears in May and beginning of June.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, July 15.*

Description of the Larva of Cidaria suffumata.—Rests in nearly a straight posture, its

feet as well as claspers holding the food-plant; the head generally porrected and elevated: when disturbed it raises the fore part of its body and tucks in its head. Head rather small: body with a rough or wrinkled skin, and both head and body emit short scattered bristles, each bristle emanating from a scarcely perceptible wart; all the segments centrally swollen, especially below, but without dorsal humps. Colour of the head pale brown, freckled with black: colour of the body brown of various shades; the dorsal area decidedly darker than the ventral area, and separated by a clear line of demarcation; the 10th, 11th, 12th and 13th segments have the same pale hue above and below; the 2nd, 3rd and 4th segments are marked by a median whitish dorsal stripe; the 5th, 6th, 7th, 8th and 9th with a dark V-shaped mark, pointing towards the head, and its arms extending on each side as far as the spiracles; each V-shaped mark contains a median dark mark, somewhat shaped like an arrow-head, and bordered with a pale margin; the belly is traversed by gray, waved, interrupted and not clearly defined stripes, extending throughout its entire length; the spiracles are intensely black. I am indebted to the Rev. J. Hellins for this larva, who fed it on *Galium Mollugo* (great hedge bedstraw): with me it ate *Asperula odorata* (sweet woodruff), apparently with great enjoyment, but its natural food-plant is unknown to me: it spun among the leaves of the woodruff towards the middle of June, and the moth appeared in July.—*Edward Newman*.

Description of the Larva of Cidaria testata.—Rests in a straight posture, and does not fall off its food-plant when disturbed; head flat, porrected; body cylindrical, without humps. Head putty-coloured, with darker dots and reticulations: body putty-coloured; back with a slender median brown stripe; sides with two dingy white stripes, the upper straight, the lower undulating: the spiracles are placed below the second white stripe, and are intensely black; the belly has six whitish stripes, of which the median ones are closely approximate: the divisions of the segments are marked by slender rings of a pink tinge. Feeds on *Betula alba* (birch) and *Salix capræa* (sallow), and is full fed at the end of May, when it spins a few threads, and draws together the leaves of its food-plant, making a very open kind of net-work cocoon, so open indeed as not in any degree to hide the enclosed pupa, which will even drop out through the meshes if shaken. The pupa is rather long, and very pointed at the tail: it is of pale putty-colour, with a broad conspicuous median brown stripe down the thorax and abdomen: the oblique posterior margins of the thorax are also of the same dark colour: the cephalic and thoracic envelopes are dingy brown, lined with darker brown, by which colour the antennæ, legs, wing-rays, &c., are clearly indicated; the envelope of the antennæ slightly exceeds that of the wings in length; on the abdomen is a median dark stripe below, corresponding with that above, and the lateral region between these two stripes is spotted with dark brown. The perfect insects emerge from the pupæ about Midsummer Day. I am indebted to Mr. Thomas Hockett for the loan of the larvæ and pupæ whence my descriptions are taken.—*Id.*

Occurrence of Platypteryx sicula near Bristol.—I have to record the occurrence, during the last month, of *Platypteryx sicula* at Leigh Wood, the same locality where the three previous examples of this species were taken. Several beautiful specimens fell to my lot; three specimens were also taken by a friend who was with me at the time. I am not aware of any others having been taken.—*George Harding; Stapleton, near Bristol, July 13, 1861.*

Description of the Larva of Cilix spinula.—When at rest the incrassated anterior extremity slightly elevated, and the head tucked in or bent under, and touching the

leaf on which the larva is standing: when handled or disturbed it does not feign death or fall off its food, but remains motionless, clinging with great tenacity to the leaf; in this operation it uses the ventral claspers only, the legs not touching the leaf, and the caudal extremity being elevated. Head prone, with a bifid crown, its divisions conspicuous, but obtuse: 2nd segment with four minute pointed warts, transversely arranged; 3rd segment with two larger dorsal warts, placed transversely; 4th segment with two still larger dorsal warts, also placed transversely; 11th segment with a transverse dorsal protuberance; 12th segment with a pair of minute dorsal warts, placed transversely: every wart terminates in a minute bristle: ventral claspers eight, on the usual segments; caudal claspers aborted, or soldered together and forming a single terminal and gradually attenuated spine or spike, which never appears to touch the leaf on which the larva is feeding, but to be elevated in the air without occupation; at the base of this spike is a minute wart on each side: the body is altogether rugose, and the skin pitted with small depressions. The colour is dingy brown, with a narrow median darker dorsal stripe, and numerous minute rivulet markings, and also a pale lateral elevated line on each side of the 12th segment. Feeds on *Cratægus Oxyacantha* (whitethorn), and is full fed the first week in July. When full fed it spins a tough gummy cocoon, attaching it to a twig of the hawthorn, generally in the axil of one of the thorns, and fixing, on the exterior, fragments of the still green leaves in such a manner as to conceal the cocoon effectually from sight; in this the pupa remains not longer than two or three weeks: the moth appears on the wing towards the end of July.—*Edward Newman*.

Description of the Larva of Clostera anachoreta. — Does not roll in a ring, fall, or feign death when disturbed; body slightly depressed, having a double skin-fold, extending its entire length, on each side in the region of the spiracles, a prominent median hump on the back of the 5th segment, and a second but less prominent median hump on the back of the 12th segment. Head black, slightly shining, beset with chestnut hairs: body velvety black, mottled and reticulated with smoky gray; a broad median stripe of dingy white down the back; this stripe is composed of square median markings, which are situated respectively on the 4th, 6th, 7th, 8th, 9th, 10th and 11th segments; that on the 4th segment is isolated, but not so clearly defined as the others, which are strung together by four parallel whitish lines, situated in the interstices of the segments; these connecting lines are especially observable when the larva is crawling: the humps on the 5th and 12th segments are bright chestnut-brown; that on the 5th emits a few longish chestnut-brown hairs; and there are a series of markings of a similar colour along each side on the elevations of the skin-folds, both above and below the spiracles: the 5th segment is entirely without the median white mark, its site being occupied by the chestnut-brown hump, and on each side of this is a somewhat square spot of snowy whiteness, and entirely surrounded with intense velvety black: on each side of each of the square white dorsal markings is also a squarish spot of intense velvety black: the back of the 2nd, 3rd and 13th segments have a transverse series of small chestnut-coloured prominences, emitting chestnut-coloured hairs; the belly is pale smoky gray; the legs black; the claspers smoky flesh-coloured. This beautiful larva was first found by my friend Mr. Sidney Cooper, feeding as he believes on *Salix capræa* (sallow); afterwards by Dr. Knaggs, feeding on *Populus nigra* (black poplar): Mr. Cooper only took two specimens, not being aware of the value of his capture until the perfect insect emerged: Dr. Knaggs was more fortunate, and, although he obtained but a few individuals, has succeeded in maintaining

a succession of broods. To this gentleman I am indebted for the opportunity of describing the larva. In confinement it feeds voraciously on either of the plants mentioned. The two localities given for the insect are certainly calculated (if not designed) to lead our assiduous larva-hunters astray: "in the neighbourhood of London" is literally untrue: "home counties" is within the verge of truth, but conveys no idea whatever of the exact truth. As I have been favoured with a knowledge of the spot under the seal of secrecy, I can say no more on the subject. The specimen kindly given me by Dr. Knaggs spun a tough cocoon between two willow leaves, on the 14th of July.—*Edward Newman*.

Occurrence of Notodonta bicolor in Staffordshire.—At the ordinary monthly meeting of the Manchester Entomological Society, held on the 3rd of July, Mr. John Smith, an artisan collector resident here, exhibited a specimen of *Notodonta bicolor*, captured by himself at Burnt Wood, Staffordshire, in the latter part of June last. The specimen, a fine male, though a little rubbed, through being boxed out of the net, excited much interest at the meeting, as being the first of the species known to have occurred in Great Britain proper, and also as somewhat of a reward for their perseverance in the working of a distant locality, of a small knot of entomologists, among whom zeal for the true progress of their favourite study, and the wish to give an unselfish example, are made to supply the places of little means and still less leisure.—*J. Hardy, pro Sec.*

Description of the Larva of Episema ceruleocephala.—Will not roll in a ring, feign death, or fall off its food when handled or disturbed, but clings with greater tenacity, drawing in and trying to conceal its head; head small; body almost uniformly cylindrical, transversely wrinkled. Head glaucous or blue-green, with two black spots on the crown: general colour of the body glaucous-green above, tinged with smoke-colour, and having a median rather broad yellow stripe interrupted at each junction of two segments; on each side, just below the spiracles, is another yellow stripe, seated on a longitudinally raised fold of the skin; below this the body is smoky green, shading off to yellow-green on the belly: on every segment are numerous black warts, each of which emits a single black bristle; the most conspicuous of these warts are four on the back of every segment; the anterior nearer together than the posterior pair: the yellow median stripe passes between them, leaving two on each side: each of the warts seems to acquire a greater intensity of colour from its being surrounded by a paler space: the legs are shining, glaucous and black-spotted; the claspers opaque green, with two black spots on each. It feeds on *Cratægus Oxyacantha* (whitethorn), and is full fed about the middle of June, when it spins an oblong cocoon, formed of minute particles of the rind of the whitethorn twigs, small fragments of the green leaves, and an abundance of silk; this is generally attached to the under side of a hawthorn twig: in this it changes to a pupa, and remains in that state about two months, the moth commonly appearing in September.—*Edward Newman*.

Description of the Larva of Charadrina Alsines.—Before last moult:—Back and subdorsal parts dusky purplish brown. Sides and belly yellowish gray. Central dorsal line whitish. Subdorsal line edged with black. Central line bordered on either side of each segment by a large black tubercular spot. Spiracular line wavy, blackish. Between subdorsal and spiracular lines a row of blackish tubercular spots, smaller than the dorsal ones. Both dorsal and lateral tubercles surmounted by a longish white hair. Head dusky yellowish brown. Belly mottled on the sides with dusky markings. After last moult:—Ground colour pale reddish drab or buff. Back more or less tinged with purplish brown. Central dorsal line whitish, bordered with black at the

centre of each segmental division. Tubercular spots as before. Subdorsal lines yellowish white, edged on the upper side narrowly, and on the lower side broadly, with black, and dotted on the former, on each segment, with a yellow tubercle having black centre. Spiracles enclosed in a dusky space between two black lines. Tubercular hairs yellowish. When very young the ground colour is a uniform pale yellowish gray. Central dorsal and subdorsal lines white, the latter indistinct. Spiracular line blackish. Dorsal and lateral tubercles very small and indistinct. The larvæ from which the foregoing description was taken were reared from eggs laid by moths taken by myself in August. They were hatched in about six weeks, and fed throughout the autumn and winter on *Alsine media* (chickweed). They were full fed in March. Pupa bright red, short and stout, enclosed in a tightly-spun earthen cocoon.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Tring, July 15.*

Description of the Larva of Charadrina blanda.—When quite young this larva is not distinguishable from that of *C. Alsines*, but after a few moults they may be separated with the greatest ease. Before last moult:—Ground colour reddish gray or buff. Down the centre of the back a series of fig or mushroom-shaped dusky blotches, intersected by a whitish central line edged with black. Subdorsal lines whitish, edged with black on the lower side. Space between subdorsal lines and spiracles dusky. Spiracles and spiracular line black, the lower edge of latter buff. Dorsal, subdorsal and spiracular lines studded with very small scarcely perceptible tubercles, each surmounted by a whitish hair. Head buff. Belly destitute of markings. After last moult:—Ground colour yellowish buff or drab. Back slightly marbled with black. Central dorsal line yellowish, edged with black, and entirely black at the centre of each segmental division. Subdorsal lines very slender and faint, black or dusky brown. Immediately below the latter a broad, distinct, dusky line. Spiracular line blackish. Spiracles black, in a white ring. Space between subdorsal and spiracular lines dusky. Belly greenish yellow. Tubercles and tubercular hairs as before. These larvæ were hatched in September, from eggs laid in August, and fed all through the winter on *Alsine media*, being full fed in April. Pupa bright red, similar to that of *C. Alsines*, enclosed in a tightly-spun earthen cocoon.—*Id.*

Occurrence of Agrotis lunigera at Torquay.—I have had the pleasure of taking both males and females of the beautiful and very local *Agrotis lunigera* this summer, at Torquay, at sugar. Some of the females are quite black, and others of a beautiful rust colour.—*George King.*

Description of the Larva of Noctua neglecta.—Rolls in a ring and falls off its food-plant, feigning death when disturbed; crawls very actively, often moving the anterior part of the body in the manner of a leach. Head rather small, shining: body uniformly cylindrical, velvety. Colour, including the head, uniform dull brown or uniform pale green, in both instances having a very slender and very obscure pale median stripe down the back, and a very distinct broader white stripe on each side immediately below the spiracles. The dorsal region is thickly dotted or reticulated with a darker colour. Feeds in the night time, on *Calluna vulgaris* (common ling), and is full fed at the end of May: it then enters the earth to undergo its change to a pupa: the moth appears in August. I am indebted to Mr. Thomas Hockett for this larva, as well as that which follows.—*Edward Newman.*

Description of the Larva of Tæniocampa stabilis.—Does not roll itself in a ring when touched, but falls off its food-plant, and twists itself violently, bringing head and tail together alternately on each side. Head rather large: body uniformly cylindrical,

quite smooth. Head pellucid shining glaucous-green: body delicate, clear bright green, velvety, with a slender pale median stripe on the back, very indistinct, but rendered perceptible by the action of the dorsal canal; a narrow transverse yellowish band crosses the back of the 12th segment; the dorsal surface mottled with indistinct paler dots; the ventral surface glaucous-green, unspotted. Feeds on *Quercus Robur* (oak), is full fed in the beginning of July, and changes to a pupa on the surface of the earth, perhaps spinning a few silken threads, but making nothing that can be properly called a cocoon. The moth does not appear until the following March.—*Edward Newman.*

Description of the Larva of Tæniocampa munda.—Falls off its food, rolls in a ring and feigns death when touched or disturbed. Smooth, uniformly cylindrical. Head nearly equal to the body in diameter, pale, very shining, wainscot-brown, mottled with black in the middle of the face, and reticulated on the cheeks. Ground colour of the body putty-white, mottled or sprinkled and obscurely reticulated with velvety black; median area of the back paler, almost assuming the appearance of a broad pale dorsal stripe, and on each side of this stripe is a series of small circular pure white spots; these are three in number on each segment, and are not arranged in a direct line, the middle one of each three being slightly nearer a median line of the back than either of the others; an intensely black, but not clearly defined, narrow, waved black stripe extends the whole length of each side, and immediately below this is a pale area, and in this area are small white patches on the 4th, 5th and 6th segments; the dorsal surface of the 12th segment is very dark, except on its posterior margin, which is pale; legs and claspers pale; last pair of claspers spreading; belly smoky gray. Feeds on *Quercus Robur* (oak) and plum, and is full fed at the end of May. I am indebted to the Rev. J. Hellins for the opportunity of describing this larva.—*Id.*

Description of the Larva of Orthosia Upsilon.—Rolls itself into a lax ring when disturbed, and falls off its food-plant, but very soon abandons this posture, and crawls with great vigour and almost incredible activity; head small; body uniformly cylindrical, smooth, velvety. Head shining, pale brown, reticulated with darker brown; body brown, with a median series of somewhat shuttle-shaped pale markings, placed end to end, and forming an almost continuous stripe: there is a slightly paler stripe on each side, including the spiracles, which are situated just within its upper margin: the dorsal area, as far as this lateral stripe, is variegated or marbled with velvety black: the belly and claspers are paler. Feeds by night, on *Salix Russelliana* (the Bedford willow) and other narrow-leaved species of the same genus; descending in the morning to the ground, or concealing itself in a crevice of the bark: on the approach of night these larvæ leave their hiding-places, and crawl up the trunks of the willows, travelling at a great rate, and in windy weather invariably keeping on the lee side of the trunk: they are full fed at the end of May, when they finally descend to the ground, and change to pupæ in a slight cocoon on the surface of the earth. The moth appears in July, and may be observed flying in great abundance round the tops of willows, especially in the rope-walks near London: it probably lays its eggs on the topmost twigs. I am indebted both to Mr. Wright and Mr. Hockett for this larva.—*Id.*

Occurrence of a new British Noctua in Ireland.—Mr. C. G. Barrett has again been successful in taking an *Hadena* new to Britain, at light, in Ireland. It has a great resemblance to *Hadena Protea*, but is considerably larger: the name will be ascertained, and published in the 'Zoologist' as soon as practicable.—*Id.*

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

July 1, 1861.—G. R. WATERHOUSE, Esq., V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors: 'Exotic Butterflies,' Part 39; presented by W. W. Saunders, Esq. 'Journal of the Proceedings of the Linnean Society,' Vol. v. No. 20, and second supplement (Botany); by the Society. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' by Francis Walker, F.L.S., &c., Part xxii. (Geometrites); by the Author. 'The Zoologist,' for July; by the Editor. 'Liste des Hyménoptères Recueillis en Sicile par M. E. Bellier de la Chavignerie, pendant les mois d'Août et Septembre, 1859,' par le Dr. Sichel; by the Author. 'The Journal of the Society of Arts' for June; by the Society. 'Stettiner Entomologische Zeitung,' Vol. xxii. Nos. 4—6; by the Society. 'The Entomologist's Weekly Intelligencer,' Nos. 240—247; by H. T. Stainton, Esq. 'Report of a Lecture delivered by J. O. Westwood, Esq., M.A., F.L.S., Hope Professor of Zoology in the University of Oxford, on the Metamorphoses of Insects, at the Royal Institution of Great Britain, on Friday, May 24, 1861; by the Author. 'Pocket Catalogue of British Coleoptera;' by the Author, G. R. Waterhouse, Esq.

Vote of Thanks.

A cordial vote of thanks was passed to W. Wilson Saunders, Esq., for the liberal entertainment provided by him on the occasion of the Society's excursion to Reigate, on the 21st ult.

Election of a Subscriber.

Robert Hackshaw, Esq., of Merton Road, Kensington was balloted for, and elected a Subscriber to the Society.

Exhibitions.

Mr. Baly exhibited the type specimens of the new species of Hispidæ in Mr. Bowring's collection, described in the first part of the 'Catalogue of Hispidæ,' prepared by him for the Trustees of the British Museum.

Sir John Hearsey exhibited a large box of Indian insects of various orders, being a portion of the collection made by him during his recent service in that country.

Professor Westwood remarked that the box of insects exhibited by Sir John Hearsey contained many fine species, especially of butterflies, peculiar to Assam and the Darjeeling district of the Himalayas; likewise a specimen of *Necroscia Tages*, a spotted winged species of Phasmidæ, hitherto unique in the Hopeian Collection, as well as one of a new genus of Actetidæ of considerable size, also hitherto unique in the same collection; also specimens of each sex of the remarkable Lamellicorn *Peperonota Harringtonii* of Westwood, and a fine new Prionideous insect with spotted elytra.

Mr. F. Smith exhibited a specimen of the singular bee parasite *Braula cœca*, *Nitzsch.*, found in Devonshire on *Apis Liguria*. He stated that the species had not hitherto been recorded as an inhabitant of Britain; on the Continent it was found on the common honey bee, *Apis mellifica*, and it was rather singular that it was observed for the first time in this country on the recently imported species *A. Liguria*.

Professor Westwood observed that Genmar's figure of this bee parasite was very indifferent; the best figure had been published in Italy, by M. Achille Costa, under the name of *Entomobia apum* (*Storia completa del Entomobia apum e su i danni che arreca alle api da Miele; atti del R. istituto d'incoraggiamento, vol. vii. 1845*).

Mr. Haward exhibited a series of specimens of *Tillus elongatus*, and suggested the probability of the dark individuals being specifically distinct.

Mr. Janson observed that Fabricius had described the so-called variety, having the thorax dark, under the name of "ambulaus."

Mr. Haward remarked that he had captured thirty-seven examples of *Ammæcius brevis* under one clod of dried horse-dung, which circumstance he considered indicated its affinity to *Aphodius*.

Mr. Stevens exhibited some examples of *Ceutorhynchus Crux*, *C. setosus*, *C. hispidus*, &c., lately taken near Mickleham.

Mr. Stevens also exhibited some fine *Lepidoptera*, sent from the Cape of Good Hope, by Mr. R. Trimen.

Mr. Stevens announced that Mr. Trimen was about to publish a work on the butterflies of South Africa, to be intitled 'Rhopalocera Africæ Australis,' and added that he should be happy to receive the names of any members who might wish to become subscribers to this work, which it was intended should be completed in two parts, at five shillings and sixpence each.

Dr. Knaggs exhibited a drawing of the larva of *Acidalia strigilata*, made the day before it commenced forming its cocoon, and being the only one which he had succeeded in rearing from the eggs obtained by him last season.

Mr. Stainton exhibited a singular larva, mining in birch leaves, which he had received from Scarborough. The mine began at the tip of the leaf, became gradually broader till it swelled out into a blotch in the centre of the leaf, where the larva cuts out a round case formed of the two skins of the leaf. Mr. Stainton said he would not express an opinion as to the order to which the insect belonged; he had brought it for exhibition, in the hopes of getting some information concerning it, but he might remark that the mine more nearly resembled that of *Tinea bistrigella* than any other mine he knew.

Mr. Stainton also exhibited drawings of the singular gall-like swellings of the stems of *Silene nutans*, formed by the larvæ of *Gelechia cauligenella*. Mr. Stainton remarked that there was nothing abnormal in the appearance either of the larva or perfect insect, though its habits were so singular. There was no apparent opening into the gall, the larvæ evidently effecting their entrance there whilst very young and when the plant was beginning to grow up. When the larvæ were full fed they ate their way out of the gall.

Mr. McLachlan exhibited a series of a rare *Trichopterous* insect, *Limnophilus incisus* of Curtis = *Colpotaulius excisus* of Kolenati. These he took near Merstham, on the 21st ult.

Mr. McLachlan also exhibited a long series of *Acentropus niveus*, among which were two female examples, taken recently at the Hampstead Ponds, a new locality for this species; also bred specimens (with the cases) of *Coleophora olivaceella*, and the same of *C. solitariella* for comparison; and a bred specimen of *Nepticula ulmivora*, the larvæ of which, mining in elm leaves, he recently discovered for the first time in England, near West Wickham.

Captain Cox exhibited some excellent drawings of the larvæ of *Lepidoptera*, and

remarked on the rarity of Lepidoptera during the present season, which was probably to be attributed to the cold and wet of the last summer.

Mr. Waterhouse observed that he never remembered to have seen so few Coleoptera as in the present summer; and Mr. Smith stated that Hymenoptera had hitherto been extremely scarce; other members present remarked that their experience confirmed these statements.

Professor Westwood observed that although mangold wurzel was usually considered almost free from insect attacks, yet the crops this season in many distant counties (Devon, York, Hereford, Oxon, &c.) were attacked by the larvæ of a Dipterous insect (fam. Muscidæ, and probably allied to Tephritis), which mine into the leaves, forming large blotches, which soon shrivel up. It was evident, therefore, that the previous season had exerted no influence in checking the production of this obnoxious species, and in like manner the Aphis of the cherry and plum, and the black Aphis of the bean, as well as the gooseberry sawfly, had been most extensively abundant and injurious this season.

Mr. McLachlan read the following:—

*Remarks on the Supposed Influence of the Food of the Larvæ in causing
Variation in Lepidoptera.*

“The Natural History of *Coleophora olivaceella* appears to have some bearing on the question so often asked at our meetings, ‘Are not many of the so-called species of Micro-Lepidoptera merely modifications of one or more previously described species produced by the larvæ having fed on different plants?’ It appears to me that, as has often been said before, this question would never have arisen but for the almost microscopic dimensions of the creatures; and at the same time I would premise that I am decidedly opposed to the creation of species on imaginary differences, and that it is possible that some few, now considered distinct, may, when their habits become more known, sink to the rank of varieties; but that food has any more than the very slightest influence in causing such variation is, I think, very doubtful. *Coleophora olivaceella* is an insect which, in the perfect state, is very similar to *C. solitariella*, and, moreover, the two larvæ feed for at least the greater portion of their existence as such simultaneously on the same plant (*Stellaria Holostea*); but the cases of the larvæ and their mode of feeding are so very different that all who believe in species at all must consider them distinct. These differences are not worth pointing out here; they have already been elaborately detailed by Mr. Stanton in the ‘Entomologist’s Annual’ and ‘Intelligencer,’ and by M. Fologne in the ‘Transactions de la Société Entomologique Belge.’ Take again *Nepticula ulmivora*, which is extremely similar to *N. marginicolella*, and both larvæ mine at the same time in elm leaves, sometimes sharing the same leaf, yet the larvæ differ in colour, and mine in a distinct method, and each larva invariably produces an imago having small though constant distinctive characters, so that no one can believe them identical.

“Similar instances might be multiplied among the Micro-Lepidoptera almost *ad infinitum*. Yet it is constantly hinted that two insects, which—in addition to having equal peculiarities with those before mentioned—feed in a different plant, may be only varieties of one caused by the latter circumstance. Now, on the contrary, does it not seem more natural to suppose that, if there were doubt about the matter, this should rather turn the scales, and cause us at once to consider them distinct? In many genera in which the individual species vary the least the larva of each species affects

many different plants, the specimens bred differing only slightly in size and depth of colour. And, again, as far as my small experience goes, the species of other genera have each their own food-plant, or perhaps frequent one or two closely allied species. That differences so great as even to be called varieties can be produced by change of food I must believe to be impossible. All who have paid any attention to breeding Lepidoptera will readily say how impossible it is to produce varieties at will, and how an occasional specimen will make its appearance with such peculiarities of form and markings that, had it been taken at large, with no knowledge of its previous history, it would have stood a fair chance of remaining undetermined or described as new, but which has been bred from the same brood of eggs kept under precisely the same circumstances. And certain species of *Peronea* are familiar instances of the imago varying to such an extent that scarcely two can be found precisely alike, while the larvæ feed on the same plant and present no differences. On the other hand, in certain genera, for instance *Eupithecia*, in many species the larvæ, though reared from the same brood of eggs and fed together on the same plant, will vary as much as the imago of *Peronea*, yet the perfect insects produced from these are identical in appearance. From these and a thousand other instances that might be cited, it does appear to me that variation caused by the food of the larva does not exist, except as to size and tone of coloration, and that any differences in the the number, position and direction of fasciæ or spots, in which consist the distinctive characters of most of the Micro-Lepidoptera in question, can be caused by this means is, as said before, open to the gravest doubts. That such variation can be caused in one or two generations seems to be quite impossible; and, supposing that any influence can be exercised in this way, it could only be in the course of ages, which theory, however ingenious, and perhaps truthful, it may be, is unfortunately from its very nature incapable of proof."

Professor Westwood observed, with reference to the views advanced by Mr. McLachlan, in the paper just read, that he had endeavoured to guard himself from misapprehension in speaking of the modification of species produced by change of food. He had indeed given it as his opinion that such a change was capable of occurrence in certain species, although he was in no position to attest it as a fact. In stating that it was difficult to meet this argument, owing to the minuteness of the Micro-Lepidoptera, Mr. McLachlan had overlooked the fact of the great variation occurring in the largest species of *Papilio*, as well as Mr. Bates' statement of the variation of the Amazonian butterflies, produced, as had been supposed, by a comparatively small geographical range, but which Mr. Westwood was inclined to attribute to other causes, seeing that in Africa the same species ranges unchanged over a great part of the continent. He considered that careful experiments as to the powers of modification of species resulting from variations of food would produce important results. He had looked in vain for any structural variation in many of the larvæ of the same genera published by Mr. Stainton, a difference in colour and a variation in the form of the mine or case (all of which might be induced by the variation of the leaves on which the insects fed) being in many cases the only appreciable differences.

Mr. Desvignes communicated a paper intituled "Descriptions of New Species of *Bassus*."

Part IX. of the current volume of the Society's 'Transactions' was announced as published.—*E. S.*

NOTICES OF NEW BOOKS.

1. *Walks, Talks, Travels and Exploits of Two Schoolboys; a Book for Boys.* By the Rev. J. C. ATKINSON, Incumbent of Danby. 434 pp. Demy 12mo. Routledge, Warne and Routledge. 1859.
2. *Play-hours and Half-holidays, or Further Experiences of Two Schoolboys.* By the Rev. J. C. ATKINSON, Incumbent of Danby. 446 pp., Demy 12mo. Routledge, Warne and Routledge. 1860.
3. *Sketches in Natural History, with an Essay on Reason and Instinct.* By the Rev. J. C. ATKINSON, Incumbent of Danby. 338 pp., Demy 12mo. Routledge, Warne and Routledge. 1861.

WE can conceive nothing more likely than these volumes to instil a love of Natural History into the minds of those for whom Mr. Atkinson has written. Of the 'Sketches' we need say nothing; Mr. Atkinson himself says of them, "The contents of the present volume first saw the light in the form of occasional contributions to the pages of the 'Zoologist;'" they are therefore already familiar to our readers. Of the 'Walks and Talks,' 'Play-hours and Half-holidays' we could say much. They abound with correct information on the habits of animals, imparted in a cheerful and readable manner. Many other writers on Natural History have achieved great successes in the way of popularity (such are B——, W——, C——, P——, and a host of others), but they invariably convey to the mind of the educated reader the idea—fallacious of course—that they know nothing of the subject on which they write so agreeably. With Mr. Atkinson it is exactly the reverse; the naturalist accompanies him page by page, line by line, and turning his thoughts inward into the treasure-house of his own experience, verifies fact after fact, and knows that the statements are true, knows the life-history of each creature is faithfully told, knows that the living being sat for the portrait Mr. Atkinson has drawn. This is as it should be. Yet there is a peculiarity in Mr. Atkinson's style which were more honoured in the breach than the observance. The very title of "Walks and Talks" leads you at once to anticipate conversations between schoolboys, and I well know that their phraseology is not very studied or very elegant when boating or birdsnesting or cricketing is the theme; nay, more than this, I acknowledge that such expressions as those which follow are very likely to be heard. "Mind your eye," "I'm blest if I don't," "That chap means mischief," "Big enough and

strong enough to tie poor Horndern in a knot," "I thought you couldn't come it again," "Look out for your pins," "Show a chap a dodge or two," "Run precious deep into his hand," "By Jove, I expected something of this sort," "How the deuce did he contrive," "By Jove, it is sprung," "The deuce you did," "The sneaking rascal," "The mean hound," "I'd break every bone in his body." These all occur in five consecutive pages, and admitting how likely they are to have been uttered *vivá voce* in the hearing of Mr. Atkinson, is it desirable to print them for the perusal of other schoolboys who may happily be ignorant of such expressions? Mr. Atkinson calls this a "book for boys;" is it well for a clergyman to instruct boys in phrases which no sensible man would desire to hear, much less repeat? Boys themselves are especially sensitive on this point, and no boy of gentlemanly feeling likes to have such peccadilloes recorded against him. I speak from positive knowledge when I assert that boys, on meeting with these expressions in Mr. Atkinson's works, have used still stronger expressions in condemning them, but expressions which must not appear in the 'Zoologist.'

I have said that the Natural History of these works is good; it is perfectly reliable, and often, which is a very great merit, original, the result of careful observation, the work of a mind knowing not only how to observe but what to observe. The instructions in entomological lore are perhaps rather out of date; the process of taking an impression of a butterfly's wing in gum water reminds me of a heirloom of great antiquity still in my possession, but Mr. Atkinson is an ornithologist rather than an entomologist, and his instructions about birds may safely be trusted.

Most earnestly do I hope that these works, which must meet with extensive circulation, will eventually appear before the schoolboys of Britain in a style more calculated to elevate than to depress the standard of excellence in the "schoolboy" mind. Educate a boy in the belief that he is eventually to become a man; point out to boydom that there is an *excelsior* to be attained; do not reiterate expressions that can call a blush into the honest face of a lad of spirit. If any man who presumes to teach can raise the intellect of others by his labours let him do so, but let him never assume that it is necessary to write *down* to an intellect of lower grade than his own; the attempt to do so conveys something very nearly approaching an insult.—*Edward Newman.*

Bush Wanderings of a Naturalist, or Notes on the Field Sports and Fauna of Australia Felix. By AN OLD BUSHMAN. 272 pp., 12mo. London: Routledge, Warne and Routledge. 1861.

WHY Mr. Wheelwright should adopt a pseudonym, in his very interesting and graphic accounts of a sportman's life in Australia and Sweden, is very incomprehensible. I trust he will abandon this course, and allow the name of an honest Englishman to supersede the *nom de guerre* that he has adopted, just as "Dickens" has superseded "Boz." In this most readable and most reliable volume there is a larger amount of information concerning the furred and feathered tribes of Australia than in all the other works that I have read on the same subjects, but at the same time I cannot overcome a feeling of dissatisfaction engendered by the constant want of precision in expression. I will exemplify my meaning by quoting the opening lines of the work.

"The kangaroo (the koorah of the natives) may be called the Australian deer, and, being the only large wild animal of chase in the country, deserves something more than a casual notice. Of the large kangaroo I fancy we had two distinct species in our forests, and a smaller variety called the wallaby, of which animal I believe there are several species, although the common wallaby is the only one met with in the Western-port district."

Here we have the kangaroo called the "Australian deer," and are told that there are two "species" of kangaroo, besides a "variety" called the wallaby, and of that "variety" there are "several species." I need scarcely tell the readers of the 'Zoologist' that the kangaroo is not a deer, that the kangaroo and wallaby are of distinct "genera," *Macropus* and *Halmaturus*, and that of each "genus" there are many "species."

Readers unaccustomed to the precision required in Natural History can form little idea of the confusion caused by this want of care in the choice of terms. The description of the leg of the kangaroo as "three-jointed" is equally unsatisfactory, and shows how necessary it is for the naturalist to study the elements of the science before he begins to publish. The work as that of a sportsman would have been much more acceptable; all the sporting passages are graphic and reliable, and I regret that the author has ventured on the task of blending science with the sports of the field; the capability of doing this effectively is a rare possession. So much for criticism; now for quotations.

“In habits the kangaroo much resembles both the sheep and the fallow deer. Timid and shy, their senses of sight, hearing and smell are most acute. Like the hare, they appear unable to see an object directly in front of them when running; at least I have often stood still and shot one down as it came running straight up to me in the open forest. It is not a ruminating animal, and the four long front teeth, two in each jaw, are sharp, flat and double edged, peculiarly adapted for cutting or browsing; and the thick blunt crushing molars betoken a purely herbivorous animal. They are very gregarious, and are always to be met with in smaller or larger droves. I have often seen as many as a hundred and fifty in a drove, and our general mobs used to average fifty or sixty. After the rutting season the old men will often draw away from the mobs, and retire by themselves to the thickest scrub. Each drove frequents a certain district, and has its particular camping and feeding grounds. The mobs do not appear to mix, and when the shooter once obtains a knowledge of the country he has no difficulty in planting himself for a shot.

“Their camping grounds are generally on some open timbered rise, and they have well-trodden runs from one ground to another. They feed early in the morning and at twilight, and I also think much by night. I fancy we might have shot them at night by a fire of dry wood lighted in a long-handled frying-pan, after the manner of torch-shooting in America; and this plan would also succeed with opossums on a dark night; but the difficulty would be to find the right kind of wood out here, for I know of no resinous trees in these forests. A good bull’s eye lantern might perhaps answer. The kangaroo lies up by day during the hot summer weather in damp thickly-scrubbed gullies, in the winter on dry sandy rises. Here, unless disturbed, they will remain quiet for hours, and it is a pretty sight to watch a mob camped up, some of them playing with each other, some quietly nibbling the young shrubs and grass, or basking in the sun half asleep on their sides. About Christmas the young ones appear to leave their mothers’ sides, and congregate in mobs by themselves. I have seen as many as fifty running together, and very pretty they looked. The kangaroo is a very clean animal. Both sexes seem to keep together, and, except in the rutting season, when desperate battles take place between the old males, they appear to live at all times in a state of domestic felicity.

“As far as I could see the sides run pretty equal. Like sheep they can be driven in almost any direction that suits the driver, and a good driver is half the battle in kangarooing. It is next to impossible to

turn a mob of kangaroo when fairly off; they may divide, but they will keep on the way they are heading. Like sheep they always follow a leader. Their principal food appears to be the tender sprouts of small shrubs and heather quite as much as grass, but there is a small kind of spike grass, brown on the under side, called the kangaroo grass, to which they are very partial. They will also come at night into the small bush inclosures, and nibble off the young blades of wheat, oats, &c. I often fancied they might be kept out of such places by encircling the fence with sewells, which we used when deer-shooting in the forests at home. These sewells are long lines of pack-thread, with two white feathers tied crosswise on the line, about a yard apart, strung up a yard or four feet from the ground on sticks. I never knew a fallow deer face them. I think we might have used them with good success in driving kangaroo, but until the game becomes scarce and more valuable the hunter will rarely go out of the old-fashioned routine to procure it. Although the kangaroos feed off the ground, they do not always appear to use the fore paws as a support, but crouch down. I have only now and then observed them browsing off the trees in a standing position, and I wonder we do not oftener see them feeding in this manner, for which their upright posture and fore arms seem peculiarly adapted. When in confinement they will eat bread, of which they seem very fond, holding it in their fore paws and nibbling it like a squirrel. They are very subject in the bush to tape-worms, and I have taken dozens out of the stomach of one which I have been cutting open. Like the sheep they can go a long time without water, and I never could detect them frequenting any particular water holes at night for the purpose of drinking. I have known their camping places on some of the plains miles away from any water hole. They appear to keep much in the neighbourhood of cattle. The kangaroo is altogether a very domestic, interesting, inoffensive animal, and I often regretted that we had no better or wilder substitute for the red deer in this country. As most of my readers are probably aware, the kangaroo, like nearly every other animal indigenous to Australia, is 'marsupial,' *i. e.*, the female is provided with a pouch outside the bottom of the stomach, in which are the teats, to one of which the young fœtus is attached during the period of gestation, I believe about sixty days, and when fully formed, as soon in fact as the young one begins to live, it becomes detached from the teat, which now supplies it with milk. When the young one leaves the teat it is in an equal state of development to the new-born offspring of any other animal; in fact, this pouch appears to be the womb of all these marsupial animals, and not, as many suppose,

merely a place of refuge in which the old mother carries her young. Here the young one at first principally lives, till able to run at the foot of the mother; but even then, when danger is near, it tumbles head over heels into the pouch for protection, and it is wonderful how quickly the old doe can pick up the joey when running at full speed, and shove it into the pouch, its pretty little face always outside. There she carries it till hard pressed, when the love of life overcomes the love of the mother, and she then casts it away to save herself. This in bush phraseology is termed 'dinging the joey.' I once saw an eagle hawk chasing a doe kangaroo, with a heavy joey in the pouch, through the forest. The cunning bird kept stroke for stroke with the kangaroo, which it hardly dare attack, but it well knew, as soon as the old mother became exhausted, she would cast away the young one. Two ounces of kangaroo-shot from my gun, however, stopped the eagle's gallop. I might have killed the old kangaroo as well, but had not the heart after seeing the struggle she was making to save the life of her offspring."—p. 7.

The following passage, relating to the dingo, places that animal in a very unfavourable but doubtlessly truthful light; the moot question of his origin is wisely left in *statu quo*; our author is not the man to clear up a matter so surrounded with difficulty.

"The wild dog, warrigal or dingo, is met with in all the thick forests, deeply-scrubbed gullies, in belts of timber bordering on the large plains, and in patches of tea tree, on the plains themselves, throughout the whole country, of course commonest in the most unfrequented districts, and is the only large wild animal of prey at present known in Australia. Shy and retired in its habits, the wild dog is rarely seen by day unless disturbed, lying up generally in thick patches of tea tree scrub till evening sets in, when, like the wolf and fox of the old world, they roam abroad in search of prey. In habits the wild dog appears to resemble the European fox much more than the wolf. Its shape, colour and general appearance is that of a fox, although much thicker and larger, and the colour is generally brighter red, but the pricked ears, sharp nose, bright eye and thick brush, all strongly remind us of 'old Reynard.' It is, however, taller and heavier, and altogether a much bolder and finer looking animal. The colour is usually light red, but there is a beautiful variety, nearly black, which is, however, rare, and, like the black fox of Northern Europe, only occasionally found in a litter of red cubs. The cry of the wild dog at night is a long dismal howl, very much resembling the horrid cry of the Swedish wolf, echoing through the forests, making 'night hideous,' and some-

times a small pack would come sweeping by our camp fire at night after kangaroo, and the chorus was then very fine when all else was still. The wild bitch brings forth from four to six cubs, like the domestic bitch, generally in a large hollow log or old tree root. Unlike the wolf they rarely hunt in large packs, and if by chance four or five are seen together, I fancy it is an old bitch and her cubs; I have, however, heard stock-riders say that they have sometimes seen a large drove congregated over a dead carcass on the plains up country. They appeared to be much more common in our forests during the winter than in the summer, and this is also the case with the northern wolf. We had no lack of them on the kangaroo ground, attracted, doubtless, by the carcasses that strewed the forests; and if we ever left a dead kangaroo out at night, it was pretty sure to be half eaten by morning. I believe the wild dog was never known to attack man. Their chief food appears to be kangaroo, sheep, all bush animals, and offal and birds, and when kept on the chain they are 'death upon' any fowls which come within their reach. They are a fearful scourge to the settlers on the large sheep runs up the country, for, strictly as the fold may be guarded at night, a wild dog or two will occasionally creep in and kill and maim many of the sheep, for, like the common dog which takes to worrying sheep, they will bite and tear perhaps a dozen to every one that they kill; and this is not the worst, for the sheep will often break fold, and, frightened to death, scattering themselves over the bush, may not be recovered again for days. There is a kind of venom attached to the bite of the wild dog, for the wound always festers, and sometimes mortification takes place: the bush remedy is to rub a little salt into the bitten part. Like the Ishmaelite of old, every man's hand is against them; they are shot, snared and run down by kangaroo dogs whenever they can be met with, but the most certain way of getting rid of them is by poison. Take a small piece of meat, cut a slit in it, and insert as much strychnine as will cover the end of the blade of a penknife; hang it up by a string to a twig about a foot or eighteen inches from the ground. The dog never goes far to die after taking this bait, but they will carry arsenic a long way. They are difficult to shoot, being very wary, and there is no regular method of hunting them carried on here; what are killed are shot, worried by bush-dogs or poisoned.

"The wild dog will often breed with the tame bush-dog, and the cross is generally larger and savager than the original breed. I recollect one morning, about daylight, going out of my tent and seeing a wild bitch with all our dogs playing round her. She made off into

the forest when she saw me. One of our dogs followed her, and came back after three days bitten all to pieces. The wild dogs are cowardly by nature, but when brought to bay they make a hard fight of it, and it will give a good bush-dog all his work to do to kill one single-handed; they snap like a wolf. When the distemper raged so fearfully a few years ago among the domestic dogs out here, it extended also to the wild dogs, and scores were found dead in the bush.

“Although called the untameable dog of New South Wales I have seen them to all appearance as tame as the domestic dog, and I knew a shepherd who had one which followed him about like a sheep dog. But they are never to be trusted, nor do I fancy that they can ever be made of any use to man, either for guarding or any other purpose. The only bark I ever heard one utter was a kind of ‘gap, gap,’ after a long howl.”—p. 35.

I search in vain for original notes on the *Ornithorynchus* or *Echidna*; our author dismisses them in a very cursory manner, which is the more disappointing as we look for original information concerning these little-known animals from every competent observer who takes up a pen. I pass on to a graphic passage on duck shooting by night.

“Of all the field sports in this colony I think I like a good night’s flight shooting the best. There is a charm in this silent, solitary sport which I could never find in any other. When seated well in the shade, by the side of some favourite feeding-ground, with the moon just on the wane, all is still, save the occasional cry of some night bird as it rises from the neighbouring swamp, or the whistle of the wings of a pair of ducks as they pass overhead, and the croaking of hundreds of small frogs in concert, the deep clock of the bull-frog joining as it were in bass accompaniment. The slight ripple of the clear water dances in the moon’s silvery rays, when all at once ‘whish,’ a splash in the water and a sharp ‘quack, quack, quack,’ warns the shooter that a black duck has pitched, and the concert of frogs is hushed in an instant. This is soon joined by others, and having risen on the water three or four times to shake their feathers, and chased each other about for a few minutes, they settle down to feed. Now is a moment of breathless suspense to the shooter. The gun is quietly raised, but the birds at first are too far off or not well packed; however, at length he gets three or four in a line, and the heavy boom of the gun breaks the stillness of the night, reverberating over the swamp with a hundred echoes. It may be that some scores of birds were feeding on the lagoon out of sight, which now rise like a clap of thunder, and

the air is disturbed by the wings and the cries of the birds as they fly round the shooter's head. His quick ear can well distinguish the different birds by their varied call-notes,—the soft musical hoop of the black swan, the sharp loud quack of the black duck, the hoarse croak of the mountain duck, the snort of the shoveller, and the shrill call of the teal, are all familiar to him; and as he gathers up his dead birds he hears the ducks pitching again in various parts of the lagoon, giving him promise of a goodly harvest by morning. When the dead birds are collected, the pipe is lit, the gun charged, and he quietly settles himself down in his rushy screen for another shot.”—p. 75.

There is a feature of this bush-life in Australia which reveals a sad omission in expeditions that have attempted to penetrate the interior. These have, without exception, been unaccompanied by a sportsman, and thus have suffered the pangs of hunger in a land abounding with the most nutritious food. It is humiliating to imagine the scenes so graphically described in recent narratives, where men of energy, courage and endurance, are represented as in a state of starvation, although the earth may be “full of fatness” and boon Nature spreading around them the most ample feast, to be had for the mere asking. Let me cite a few passages in proof of the abundance of food. “My old mate, Rendall, bagged 1500 couple of quail in one season; 25 couple a day was his general bag.”—(p. 107). Speaking of one day's shooting at Mordialloc, the author states that he and a friend “brought home to the tent at night 16½ couple of quail, 3½ couple of scrub quail, 1 rail, 3 couple of pigeons, 11 couple of snipe, 3 nankeen cranes, 1 red lowry, 5 black ducks, 3 shovellers, 3 coots, 2 black cockatoos, 2 moorheens, 7 shell parroquets;” in all 95 birds, and most of them excellent as food: the author states apologetically that he does not give this list “as anything extraordinary; he has no doubt it has often been beaten.

* * * It will, however, give the reader some idea of the varied contents of an Australian game bag.”—(p. 101). But the leading animal for food is the kangaroo, and this is indeed noble game. In the introduction the author laments the absence of a market for the produce of his gun, and looks forward to the increase of population as a certain source of gain to the sportsman. Another lament of the author's, by alluding to the decrease of game near towns, bears collateral evidence to its abundance in more remote regions. “It cannot be denied that the game is rapidly disappearing in all the settled districts, especially near towns, and if steps are not taken to prevent the wholesale destruction of the birds in the breeding season, which is now carried on, in a few years the shooter's occupation in Victoria will be

gone.”—(p. 186). Every paragraph tells the same tale, that the unsettled parts of Australia teem with the most nutritious and wholesome food for man. Here then should be the trust of the explorer; it argues simply a lack of common sense for a man to encumber himself with provisions, and thus impede his onward progress, when the gun, if even one of the party understood its use, would provision the expedition day by day.

And now let me invite the attention of our philanthropists at home to the state of the Australian native. I will place our author's observations, without note or comment, before my reader, hoping they may attract the attention of some member of some Aborigines' Protection Society, and at least elicit a sigh, if nothing more, for the fate of those human beings whom nominal Christians are hurrying to an untimely grave.

“Of the Australian aborigines I have but little to say. They are a race fast passing away, and the few that we do meet with now about Melbourne—in fact in all the settled districts—are very different men from the real Australian native of the last century. There are only two tribes now in the vicinity of Melbourne, and these are but remnants of what they were when we first took possession of their country. The Yarra Blacks, who camp about the ranges at the head of the Yarra, north-east of Melbourne, and the Bomerang or coast tribe, whose head station is at Mordialloc, and who own—if we can use that term now we have dispossessed them of all their land—the country to the southward down to the heads. These, by constant intercourse with the white man, have learnt much of our language and habits, are on capital terms with us, and there is no more danger in meeting a lot of them in the bush than a gang of gipseys at home. The Gipps land tribe seems to be the most numerous in this part of Port Phillip, and these men seem to be wilder and more ferocious than any I have seen. Wherever Government has taken up their land a Black's reserve of, I believe, a square mile is left, and blankets and rations, provided by Government, are served out to them by the master of the station nearest to their reserve. There is also a protector, or kind of magistrate, appointed to look after their worldly interests, but no one seems to trouble himself about giving them any religious instruction. It is not within my province to offer any opinion as to whether or not it is our duty to do so, after, as it were, adopting them. There is a great cry at home about sending missionaries into foreign parts of which we know but little, and yet here we have tribes of savage heathens wandering about among Christians, in the close vicinity of a large city in a rising colony,

which is now certainly more like England than any we possess, abounding in religious sects of all denominations, and yet no pains are taken to instruct or convert these poor savages. Perhaps it is not possible to do so. Perhaps they are better off as they are; and this is probably the case, for, as Bonwick justly observes, 'We have a sad tale to tell when we speak of our so-called civilization upon these aborigines.' To adopt our habits they must be entirely removed from the associations of the *mia-mia*, and what have we to offer in exchange for endearing relations, joyous freedom and an unanxious existence? The black man is thrust upon a competition society to earn his bread, he is exposed to the gibes and contempt of the lowest of our countrymen, he is without sympathy and without friends, and is herded with men from whom he learns the most obviously developed principles of European civilization—swearing and drinking. It is true he eats better food, wears better clothes, and sleeps in better dwellings; but where is his home? Who will be his sister, his mother, his brother? Who will ally herself as wife to his dark skin? Can he ever know the sweetness of a child's love? No! He soon tires of our food, our work, our confined habitations, our heartless ridicule, and hastens back to his camp fire to find a friend, to feel himself a man, to dwell with those that can love him.

"When I camped at Mordialloc I lived on very neighbourly terms with the 'Bomerang' tribe, for they generally had their 'miamies' close to my hut, and as I never made too free with them, or gave them a promise I did not intend to keep, I was a bit of a favourite with them. Like most other savages they strictly imitate the white man in all his vices, and this tribe is fast paying the penalty, for since I knew it first more than two-thirds have been swept away by disease and intemperance, and in a few years it will exist only in name. It is melancholy to see a whole race of beings thus disappear without any apparent cause. There is no prostration of physical strength or mental activity; they wither in the prime of life, and sink into the grave, as though a blight had fallen on them.

"Of the many thousands who inhabited this colony before the arrival of the white man not two thousand survive, and most of these are on the banks of the Murray. Although debased far below their own savage level, since their intercourse with the white man, the few that are left still retain much of that free independent spirit and wild roving disposition which characterises all savages who have to gain a living by the chase, for, although they can get their rations all the year round at the head station, they never care to live long in one place,

but, following up the habits of their early life, make periodical excursions into the bush at different seasons when the different game is in. Thus swan's eggs, kangaroo, ducks, pigeons, eels and cray-fish, all furnish them with food and occupation at certain seasons, and it was but rarely that many of these were on the reserve at one time. I have often remarked, when wandering through these forests, that the Blacks invariably fix upon the prettiest situations for their camping places. I cannot help thinking that the character of the Australian aborigines has been much belied by those writers who have described them as but one degree removed from the brute. I always found them honest and fond of the truth, and although they will ask for anything they fancy, just as if they had a right to it, I never knew them steal."— p. 258.

It is impossible to close this amusing and instructive little book without wishing that its author had been more methodical in his manner, more precise in his choice of words and expressions, more careful to convey exact ideas. Thus we feel doubtful whether many of the terms our author employs express his meaning. Is Australia that well-watered country which the fascinating description of the night watch by its lagoons seems to imply? Are these beautiful lakes with their pellucid waters permanent or seasonal? I have many correspondents who speak of mud-holes in the rainy seasons, of excessive droughts, overpowering dust and scorched earth in the dry season, but not one whose descriptions tally exactly with those of the "Old Bushman." Amid all the inexact and sometimes conflicting evidence there is the most direct evidence of intended truthfulness; he paints, on all occasions, the impressions his mind receives at the moment, but whether other eyes would behold the same objects under the same mental conditions is very questionable. It has been wisely said "that beauty is in the mind of the beholder," and this perhaps affords some clew to the conflicting reports we are daily receiving of that juvenile England known as Australia Felix, a country of which nothing is too marvellous to believe, and whose future is perhaps more glorious than imagination has the power to depict.—*Edward Newman.*

Darwin's 'Origin of Species.'— At page 7594 of the 'Zoologist' we read, relative to the presumed relationship between species, that "If Mr. Darwin could believe he was dealing with plants or animals, instead of inactive mineral elements, he could weave them into a genealogical series more remarkably consistent than the blood affinities he assumes exist in the organic kingdom;" and again, in the same page, his

assumed principle "is strikingly paralleled in some unrelated part of creation; for instance, the analogy between the system of arrangement of the heavenly bodies," &c. In all this it is apparently taken for granted that such a thing as relationship between the heavenly bodies on the one hand, and the so-called terrestrial elements on the other, is altogether too absurd for belief. But these analogies may be more than analogies,—may be true homologies. Our fifty or sixty assumed elementary bodies may at any moment be reduced to a dozen or fewer; and even if they are not, the bromides, iodides, &c., do indeed form very pretty *family* groups; and despite the "loves of the triangles," the loves of the elements may have yet to be sung. Sexual distinctions are wanting, but the generation of new forms (as water by the union of oxygen and hydrogen) is constantly effected by the union of one or more parental elements. In the planetary bodies the indications of common origin are more striking and conclusive; and there is ample room for believing that our solar system is literally the family of the sun. If the great Creator has willed that from a few simple forms the manifold yet subordinated varieties of heaven and earth should be eliminated, have we cause to wonder that it should please Him to form us thus? Of course I do not attempt to identify Mr. Darwin with the ideas mentioned above: he may or may not hold them; but his theory, I would submit, is applicable, with modifications, to the whole of the known creation.—*W. D. Crotch; Uphill House, Weston-super-Mare, August 5, 1861.*

The Tiger in Amoy.—The tiger is an occasional visitor in the island of Amoy. In a letter from Mr. Swinhoe, dated November 21st, 1859, he writes:—"I have, since my last, met with little of interest except a Royal tiger, of large size, in a Chinese village. I attacked him at close quarters with a fowling-piece, and made him bleed; but to avoid an awkward spring at me I fell down a precipice and nearly killed myself. No assistance being at hand, and the Chinese not daring to come near the beast, I need not tell you that I missed getting his skin. One was killed at Amoy, and I once bought a cub out of three which a Chinese had for sale, but I never met with one of the brutes before in my rambles. I was out after specimens, and was not of course provided with ball, my stock being only shot and cartridges. When I reflect on this adventure it seems a wonder that I was not killed, but a sight of that glossy striped skin emboldened me to try the odds." I sincerely trust that my esteemed friend will admit "discretion" to be "the better part of valour" on any future similar occasion. He writes (Jan. 5):—"Tigers, I am told, are greatly increasing in the neighbouring high hills. The villagers report a number of lives lost, and numerous small cattle carried away." Tigers appear to be very troublesome in the new Russian territory of Amûr, as the following extracts from the 'Journal of the Royal Geographical Society' for 1858 (vol. xxviii.) will show:—"In the same places where the elk is found the tiger prowls; and the latter animal may be called quite common, its constant abode being there. I was informed by some Zolons that there are always a great number of tigers in the mountains on the opposite or Chinese side. During winter they cross the river and seize the horses of the Zolons, who hunt them at that time. * * * The inquiries I made of those few Tunguses confirmed the fact of the tiger being found all over the Hing-gan, especially at its central and lower parts. The population are accordingly prevented from hunting there, as the tiger destroys their horses, particularly during winter. * * * The tiger always follows the fresh tracks of the wild boar,

which constitutes its principal food. * * * The inhabitants of both banks of the Usuri are employed in agriculture, which the extent and fecundity of their lands render very successful. They have bred cattle for cultivating their fields, but being often attacked by tigers it is very difficult to keep cattle in any number." See also Atkinson's 'Siberia,' and Humboldt's notice of tigers in Northern Asia, in 'Asie Centrale.' However, they do not quite range to America, albeit the poet Campbell places them on the banks of Lake Erie!

"On Erie's banks, where tigers steal along;"

nor to Africa, though Sir Walter Scott locates them in "Lybia!" The Russian expedition employed on the survey of Lake Aral found them troublesome, even there, in mid-winter! Here it may be remarked that tigers appear to be fast multiplying in Penang, where notices of the occurrence of this animal have several times appeared in the journals from the middle of 1859. In the island of Singapore, where they are now so numerous and destructive, they made their first appearance five or six years after the establishment of the British settlement; and but three or four years ago Dr. Oxley wrote:—"The channel between Penang and the main is two miles broad; and this has been sufficient to exclude the tiger, for although there have been examples of individuals having crossed over, it has been in an exhausted state, and they have been immediately destroyed." Since this was written the tiger would appear to have fairly established itself on the island. In another communication, dated December 8th, Mr. Swinhoe notices two other species of Felis. He remarks:—"A wild Felis is found in Hongkong marked like the domestic cat, but much larger; and an animal known to Anglo-Chinese as the 'tiger-cat;" from the description sent, evidently *F. macrocelis*, or *F. macroceloides* if this be distinct, or an animal very closely akin. A specimen is promised shortly.—*E. Blyth*, in a Note appended to a Report on *Mammalia* transmitted to him by Mr. Swinhoe, of Amoy.

New Chinese Deer?—Mr. Swinhoe writes:—"A stag has just arrived here from the north, and is in the possession of a gentleman next door to me. It stands nearly three feet at the shoulder, has a short head, and horns about ten or eleven inches long. Its face and over the eyes are black; neck and ears blackish gray. Median line of back black, blending on the sides with blackish chestnut. Legs black, getting gray towards the hoof. Tail and buttocks white." Pretty clearly the Siberian roe (*Capreolus pygargus*, Pallas). But what is the so-called "roebuck" of the Amûr territory, noticed in the 'Journal of the Royal Geographical Society' for 1858 (vol. xxviii. p. 397)? *Cervus Wallichii*, or a kindred species? "The roebuck," we are told, "is an animal resembling the elk, but has a smaller body, although the head is comparatively larger. Its flesh is savoury and nutritious; but the principal value of this animal lies in its horns, which contain, at a certain period of the year (I think in March), a marrow of peculiar medicinal properties, which is highly prized by the Chinese, who, at the best season of the year, pay as much as sixty roubles (£9 10s.) for a pair of good horns," &c. This animal is mentioned in addition to "the elk," the common roe and others. Further particulars of the Chinese deer have been received from Mr. Swinhoe, dated December 8th, 1859. "The skull I sent you," he remarks, "was that of an elderly buck, one of a pair in the possession of a gentleman here. It died while in his care, and its skin was so worthless that I did not keep it. The doe is still alive and in good health, and from her personal appearance I observe that your surmise as to the summer duration of the white spots is quite correct. She

has already nearly lost all the white marks. I hear that there are several more of the same species in the possession of a mandarin here, and I intend shortly visiting him to inspect them. As far as I have yet ascertained, the species is purely Formosan; a larger stag, with large branching horns and having a redder coat (*i. e.* summer vesture), replacing it in Shantung and North China. This other species I am assured is also found in Formosa, but this requires confirmation. The small muntjac (*Cervulus Reevesii*), 'kina' of this dialect, is abundant in Formosa, having myself met with it there and seen skins. The other deer-skins shown me on my tour round Formosa were all of the spotted species. You say that no elaphine deer are found, in India, south of the Himalayas. Let me remark that this deer is from Formosa, where I have seen mountains covered with snow in summer; and it is most probable that these animals are sold by the savages to the Chinese settlers, as in our inland tour over the hills for some forty miles we met none, and the Chinese spoke of them as coming from the mountains, and of their skins as forming articles of barter. We have a Japanese deer at Amoy with horns short and somewhat like those of the Formosan. It is not so elegant as mine, shorter in the legs, about the same height, and of a far more stag-like aspect. This, I doubt not, is the *Cervulus Sika* of Schlegel; but what our large northern stag can be I have not had the opportunity to ascertain. There are a few of the horns of the Formosan species to be got, which I will try to procure for you."—*Id.*

The Pangolin.—The Chinese, like the natives of India, class the pangolin as a fish, and it is curious that both people approximate it to certain carps. Thus, in India, this animal is known as the *jungli-máth* (jungle-fish) or *Bán rohi* (jungle rohi), in reference to the *Rohita vulgaris*, or *Cyprinus rohita* of B. Hamilton. In some amusing notices of Chinese Natural History, published in the 'Chinese Repository' for 1838, p. 48, we find the pangolin thus described:—"The *ling-le*, or 'hill carp,' is so called, says the 'Pun Tsaou,' because its shape and appearance resemble those of the *le* or carp; and since it resides on land, in caves and hills, it is called '*ling*,' a character compounded of '*yu*,' fish, joined to the right half of '*ling*,' a high rocky place. It has by some been termed the '*lung-le*,' or 'dragon-carp,' because it has the scales of the dragon; and by others '*chuen shan kéas*,' or 'boring hill-scales,' because it is the scaly animal that burrows in the hills: the last name is the one by which the creature is best known among the people of Canton. An ancient name is '*shih ling yu*,' or 'stony hill-fish,' given to it because the scales on its tail have three corners, like the '*ling ká*,' or 'water calthrops,' and are very hard. This animal, for which the Chinese have as many synonyms as some anomalous perch or *Hedysarum*, is the *manis*, pangolin, or scaly ant-eater, and is often seen in the hands of the people of Canton, by whom it is regarded as a very curious 'muster.' They consider it as 'a fish out of water,' an anomaly irreconcilable with any classification; and in the standard treatises on Natural History it is placed among the crocodiles and fishes." Further details are given; but I pass to an amusing description of this animal by the old Dutch traveller Linschoten, translated into quaint old English. He, too, describes it as "a strange Indian fish," caught in the river of Goa; "the picture whereof, by commandment of the Archbishop of that city, was painted, and for a wonder sent to the king of Spaine." He says:—"It was in bignesse as great as a middle-sized dog, with a snout like a hog, small eyes, no eares [the particular species has a small ear-conch], but two lobes where his eares should be; it had foure feete like an elephant, the taylor beginning somewhat upon the backe, broad and then flat, and at the very end round and somewhat sharpe. It ranne along the hall upon the floore, and in

every place in the house, snorting like a hog. The whole body, tayle, and legs being covered with scales of a thumbe breadth, harder than iron or steel. We hewed and layed upon them with weapons, as if men should beate upon an anvill, and when we strooke upon him he rouled himself in a heape, head and feete together, so that he lay like a round ball, we not being able to judge whether he closed himself together, neyther could we with any instrument or strength of hands open him againe, but letting him alone and not touching him, he opened himself and ranne away, as I said before."

—*E. Blyth.*

The Musk Cat of Shanghai. — So little is known of the Mammalia of China that any contribution on the subject is of interest to zoologists. There is an animal known at Shanghai as the "musk cat," which I suspect is a species of marten unknown to naturalists. It is thus described:—"A beautiful animal, of about the size of the common cat, but longer in form; in fact, somewhat resembling the marten, with a long bushy tail, like the brush of a fox. Emits an exceedingly powerful and by no means disagreeable musky odour. Lives in holes of the ground, and also climbs into trees and bushes in search of birds and their nests. Exceedingly destructive to the pheasants when sitting, and is much hunted by the natives for its fur."—*Bengal Sporting Magazine*. Probably identical with the "large marten" of the Amûr territory, noticed in the 'Journal of the Royal Geographical Society' for 1858 (vol. xxviii. p. 424).—*Id.*

Wild Swine in Sumátra.—"A species of wild hog in Sumátra, of a gray colour, and smaller than the English swine, frequents the impenetrable bushes and marshes of the sea-coast; they associate in herds and live on crabs and roots. At certain periods of the year they swim in herds, consisting of sometimes a thousand, from one side of the river Siak to the other at its mouth, which is three or four miles broad, and again return at stated times. This kind of passage also takes place in the small islands, by their swimming from one to the other. On these occasions they are hunted by the Salettians, a Malay tribe residing on the coasts of the kingdom of Siak. These men are said to smell the swine long before they see them, and when they do this they immediately prepare their boats. They then send out their dogs, which are trained for this kind of hunting, along the strand, where, by their barking, they prevent the swine from coming ashore and concealing themselves among the bushes. During the passage the boars precede, and are followed by the females and young, all in regular rows, each resting its snout on the rump of the preceding one. Swimming thus in close rows, they present a singular appearance. The Salettians, men and women, meet them in their small flat boats. The former row, and throw large mats, made of the long leaves of the *Pandanus odoratissima* interwoven through each other, before the leader of each row of swine, which still continue to swim with great strength, but soon pushing their feet into the mats, they get so entangled as to be either disabled altogether from moving, or only to move very slowly. The rest are, however, neither alarmed nor disconcerted, but keep close to each other, none of them leaving the position in which they were placed. The men then row towards them in a lateral direction; and the women, armed with long javelins, stab as many of the swine as they can reach. For those beyond their reach they are furnished with smaller spears, about six feet in length, which they dart to the distance of thirty or forty feet with a sure aim. As it is impossible for them to throw mats before all the rows, the rest of these animals swim off, in regular order, to the place from which they had set out, and for this time escape the danger; and the dead swine, floating around

in great numbers, are then pulled up and put into larger boats, which follow for the purpose. Some of these swine the Salettians sell to the Chinese traders who visit the island; and of the rest they preserve in general only the skins and fat. The latter, after being melted, they sell to the Maki Chinese; and it is used by the common people instead of butter, as long as it is not rancid, and also used for burning in lamps, instead of cocoa-nut oil."—*Bingley's 'History of Quadrupeds.'* I have somewhere read a similar account of the habits of *Sus papuensis*. Of the large Indian hogs, I am now satisfied of the existence of three well-marked races or species, which are quite as distinct from each other as are the various species of the Archipelago, figured and described by Dr. S. Müller and others. One is the proper Bengal boar, found also in Kuták, which is by far the most powerful, as shown by the entire skeleton, and which has the longest and most formidable tusks of any, the lower commonly protruding from the socket from three to three and a half inches over the curve. It is specially distinguished by the breadth of its occipital plane, which is two inches to two inches and a quarter where narrowest; and by the shortness of the tail, which numbers only thirteen or fourteen vertebræ. This may be distinguished as *S. bengalensis, nobis*. Another is the ordinary *S. indicus, Gray* (*S. cristatus, Wagler*), as noticed by Dr. Gray, from the Madras Presidency; it being found over the whole of India, the highlands of Ceylon, and also in Arakan, but I cannot pronounce on its diffusion further. It is likewise an inhabitant of Lower Bengal, as we have a stuffed specimen of a particularly fine boar of this race that was speared near Calcutta. The domestic pigs of India appear to be mainly (if not wholly) derived from it. The entire skeleton is conspicuously less robust than in the preceding, the tusks less developed, the lower rarely projecting two inches and three-fourths from the socket; the occipital plane, where narrowest, rarely exceeds one inch and five-eighths; and the tail is conspicuously much longer, consisting of about twenty vertebræ. We have the skull of a sow of this race which has the fully-developed tusks of the boar; of course a rare anomaly. The third is the species with very elongated skull and narrow occipital plane (where narrowest one inch only), inhabiting the lowlands of Ceylon, which I have denominated *S. zeylonensis*, and which may also be *S. affinis, Gray*, from the Nilgiris, mentioned in the 'List of the Osteological Specimens in the Collection of the British Museum,' where *S. indicus* is cited from the Nepal hills and 'tarai,' and also Malabar. I have no skull of an European wild boar for comparison, but, judging from Blainville's figures, our *S. indicus* approximates it more nearly than *S. bengalensis* or *S. zeylonensis*. In the new Russian territory of the Amûr it appears that "of cattle or horses few were seen, but many swine of a peculiar kind, and fowls." Wild hogs are found at all elevations in the Himalaya, and generally over Asia; those of Indo-China, China, and the Malayan peninsula require to be carefully examined: as many as three species are reported to inhabit the plain of Mesopotamia. Wood, in his 'Journey to the Source of the Oxus,' remarks that, "descending the eastern side of Junas Darah, our march was rendered less fatiguing by following hog-tracks in the snow. So numerous are these animals that they had trodden down the snow as if a large flock of sheep had been driven over it."—*E. Blyth*.

Bats in Aberdeenshire.—Close by one of the finest reaches of the river Dee, and near the hazely brae where the youthful Byron roamed and gathered nuts, are the church and the well of St. Peter. Much is to be met with in that neighbourhood, of interest alike to the naturalist or archæologist, the tourist or valetudinarian; and not

a little might be written of these matters here ; but the title affixed to this—a paragraph for the 'Zoologist,' suggested by Dr. Kinahan's paper (Zool. 7617) on the bats of Clare—confines the present notice to two species of Vespertilionidæ, and to a locality in which they are to be met with in numbers. Bats are wide spread ; but their economy, from their nocturnal flight and the whole of their lives being spent in darkness, is but little known. Even the slightest contribution to the history of their habits will, it is hoped, not be unacceptable. It had for some time been known that the roof of the church of Peterculter, or more correctly that part of the roof which extends from the slates to the lath and plaster of the ceiling, and upwards of six feet high in the middle, was the haunt of bats. A recent ascent was made to this domicile, when a hundred and fifty or two hundred bats were found hanging, chiefly in clusters. At least two species congregate there—the long-eared bat (*Plecotus auritus* of Bell's 'British Animals'), and a smaller one (most likely *Vespertilio pipistrellus* of the same treatise). The numbers of the former somewhat preponderated. Each species clustered by itself ; no mixture of the two was observed. Individuals were seen, in some instances, hanging alone, or occasionally two or three together, but always of the same species. They did not seem to be much disconcerted by the light of a candle, and were easily taken with the hand, one of the invaders carrying off several in his cap and pockets, soon to be set free again, a privilege of which they readily availed themselves, the larger species rising easily on the wing, after a very short scramble, from a flat surface. The power of the smaller species to do so was not observed or tried at the time. The colour of two or three of the long-eared species, in their rusty white fur, had a well-marked difference, in its lighter tint, from the mass. Their bite is more dreaded than dangerous. The temperature was high, and sufficient to make the blood and nervous influence circulate with the greatest force ; yet their teeth scarcely abraded the scarf-skin of the fingers. Low in the walls, and at each end of this long and narrow apartment where the bats dwell, there is an air-hole or opening, two or three inches in diameter, cut in the well-known gray granite of the district. They are used by the bats for their exit and entrance. Immediately under these holes there are lengthened mounds of *débris*, showing that on their leaving or entering their abode the bats drop their *sœces*, and the quantity indicates a long possession by numbers. The church of Peterculter is about being repaired. It is to be hoped, for the sake of the rising school of Natural History in Aberdeen, as well as for the sake of preserving so many animals useful in destroying myriads of insect vermin, that the worthy heritors will not allow architect or craftsman to dispute or interfere with this now pre-criptive right of occupancy held by the colony in the upper regions of that substantial fabric.—*George Gordon ; Birnie by Elgin, August 17, 1861.*

Birds of Shetland. — I have, unfortunately, little to add to the list of the birds of Shetland. A man was reported to have the skins of three rare birds shot in North Unst, and I visited them, in the hopes of discovering some prize ; but the possessor, having already promised them (and even their reversion), was unwilling to display them, and said he had promised not to do so. At last, however, his conscience allowed him to let his daughter show them to us, he standing by ; and from the cursory examination I could thus make I believe the three were the pomerine skua, the hawk owl, and the goshawk. Mr. Gatherer, of Lerwick, also informed me that the

sand martin and the woodpecker had both been observed near Lerwick. As regards the bridled guillemot, they certainly do not nest apart from the others; nor are the eggs distinguishable; indeed the very bridle mark is variable in individuals. Brunnich's guillemot we could never see or hear of. Dr. Edmonston has previously mentioned that during the breeding season Richardson's skua feeds largely on the berries of the heather, and this we found to be the case last year. It seems probable that the snow bunting may occasionally breed in Shetland, as we heard of a pair or two remaining till the end of June, though we could not succeed in finding any nest. The common skua will soon, I am sorry to say, disappear from the list of British breeding birds: a very few pairs now remain on Hermanness. Dr. Edmonston, at a heavy expense, maintained a keeper for twenty years, and these fine birds increased from three to about fifty pairs. A Swiss collector or dealer, or amateur dealer, or something of that disreputable class, then shot down some sixteen pairs, wounding, at the same time, many others, and since then the eggs have been taken yearly, so that no young birds are hatched; and four or five years will witness their extinction. Mr. T. Edmonston of Booness, the proprietor, allows me to state that he will appoint a keeper, if a fund for the purpose can be obtained; about £5 or £6 would be sufficient, and he has kindly agreed to subscribe £2 himself towards the amount. Any gentleman who would lament the loss of such a bird to our fauna, and does not expect to gain "an equivalent," as collectors say, will perhaps be kind enough to write to the editor of the 'Zoologist' or to myself. — *W. D. Crotch; Uphill House, Weston-super-Mare.*

Destruction of Small Birds: an Appeal to the Farmer, &c.— I invite attention from all who claim as their right an enlightened mind. Who amongst us, as early spring advances, revealing itself to our gladdened sight, after perchance a stern and severe winter, but delights to hear pouring forth, from tree, shrub and every leafy dale, the sweet harmonious carol of our common songsters? There is scarcely an Englishman who does not claim this as his peculiar right. Yet these harmless creatures are daily, hourly and quietly disappearing from our land. In proof of this we have only to notice the ravages of caterpillars among gooseberry and currant bushes this season. Great spaces are made in gardens by these destructive enemies of the gardener, who adopts, as the only apparent means of saving the fruit, the precaution of gathering as fast as possible. It is well known that small birds have been and are ruthlessly and systematically destroyed, quite harmless species sharing the fate of those which may by chance steal a seed or two. To the natural foes that each tribe has to contend with may be added the professional destroyer, whose quack nostrum is advertised in every paper as capable of poisoning large numbers. It must not, in future, surprise farmers, gardeners and others, if insects become formidable in the field and garden, in the absence of those whose natural food is the insect tribe. We learn that our French neighbours have taken up the subject, and that the Senate, after being occupied with a long Report on the lark and sparrow question, requested the Minister of Agriculture to adopt some practical plan for stopping the indiscriminate killing of birds. In the course of the sitting a complete exposition of entomology, in reference to the various insects destructive of the olive, vine, grain, garden crops, &c., was set forth, and State interference on behalf of the winged vermin-hunters urged. The thoughtless man nails a bat, an owl or a crow to his barn door; but a scrutiny of what fills the crops of these supposed nuisances would teach him sense. No senator seemed aware of the efforts made to import and naturalize the common field birds of England.

in Australia. It appears the Cardinal Archbishop of Bordeaux is at the head of an active movement among his clergy for the protection of birds in the South of France, and the Prefect of Lyons has already denounced birdsnesting by schoolboys on the Rhone. I now adduce a few statistics, either from personal observation or on the authority of naturalists upon whose veracity I can rely. A short time since a boy brought me, as he said, a few small birds to look at. To my astonishment he exposed to view a hundred yellow buntings, something like fifty or sixty common buntings, thirty thrushes, and some hundreds more of perfectly harmless species, being for the most part insect feeders. All these owed their death to that detestable nostrum known as sparrow and vermin killer. Some days since I was not less astounded to see one of those rascals who designate themselves professional bird-killers with a cart load of dead birds, which he, with seeming pride, exhibited as a proof of his skill. I believe it would be no exaggeration to say that this man had destroyed the prodigious number of two thousand sparrows, seven hundred yellow buntings, six hundred common buntings, innumerable greenfinches, and linnets by the hundred. It was a sight I shall never forget. A friend says that in his parish, only a year or so since, the thrush's pleasant song might be heard in almost every copse; now the bird is almost extinct there. The famed and melodious nightingale is fast disappearing from Cambridge. Who that loves the voice of song but deeply regrets this? Such and worse will follow, if this ruthless destruction is not stayed. — *S. P. Saville; Dover House, Cambridge, August 13, 1861.*

The Kestrel pursuing a Sandpiper. — My son, when fishing in the Tummel, about two miles below Loch Rannoch, on the 23rd of July last, saw a female kestrel attempt to take a sandpiper from the water. When first seen (at the distance of about thirty yards) the sandpiper was on the water about mid-stream, and the feet of the hawk were dropped to seize him. To avoid his enemy, the sandpiper (apparently a young one) dived, rising again in about half a minute, and taking wing from the water, when the kestrel flew off, alarmed by my son's presence. As the sandpiper is not a swimmer, it must have been driven to the water by its pursuer; and it seems singular that a hawk supposed to prey chiefly upon mice, which it takes by dropping upon them much in the manner of the white owl, should thus pursue a swift-flying aquatic bird with the fierceness of the sparrowhawk. The abundance of sandpipers, and the probable scarcity of field-mice in this valley while the crops are all standing, may have had something to do with the fact. — *Henry Hussey; Kinloch Rannoch, Perthshire, August 2, 1861.*

Occurrence of the Shore Lark at Woolwich. — A week or two ago I went into a small bird-stuffer's shop here, and whilst conversing with the owner he informed me that a workman in the dockyard at Sheerness had, during the cold weather last February, shot five specimens of what he called the American lark. Upon his describing them, however, I made out that they could not be that species, being too small, having a crest on the head, and various other distinctions by no means characteristic of the American lark. The man said that the only bird which he thought in any way resembled them was the curl bunting; so I was somewhat curious to find out what these remarkable individuals really were. In my own mind I set them down as being the shore lark, if any species of *Alauda* at all; and as my friend kindly offered to get them for me to look at, I did not refuse, and a few days ago called on him again, when he showed me five specimens of *Alauda alpestris*, *Linn.* So I had guessed rightly. There were apparently two adult males, one female, and two

immature or young birds; all, except the latter, in very good condition. There is no doubt as to the fact of the birds being shot in the neighbourhood of Sheerness, as the person who killed them was quite unaware what he had shot, and only skinned them (in not a very scientific manner) because he thought them pretty, uncommon-looking birds. I am not aware if any others were shot in Kent or elsewhere last winter.—*G. F. Mathews; Woolwich, July 16, 1861.*

Occurrence of the Grayheaded Wagtail and Temminck's Stint near Brighton.—On the 27th of last April I shot a very fine adult male grayheaded wagtail, and a few days since a perfect specimen of Temminck's stint, the plumage of which is partially summer.—*Henry Pratt, jun.; 35, Duke Street, Brighton.*

Occurrence of the Nest of the Snow Bunting in Shetland.—Some years ago Dr. Edmondston expressed his belief that the snow bunting would be found breeding regularly in some of the cliffs in the north part of this island (Unst); and at his suggestion, therefore, I have carefully searched for their nests this season. My own endeavours have been rewarded only by the sight of several pairs of the birds themselves, but a man who I employed to assist me in the search has been more fortunate, having within the last week discovered a nest containing three fresh eggs. He found it in the crevice of a rock near the top of one of the high sea-cliffs at Burrafrith. It is rather shallow, and is composed of coarse dry grass and fibrous roots, lined with wool, and fine hair of horses and cows. The eggs are roundish, and measure nearly an inch in length; in colour white faintly tinged with bluish green, slightly spotted with dark brown and bluish gray.—*Henry L. Saxby; Baltasound, Shetland, July 10.*

Nesting of the Sitta syriaca and Hirundo rufula.—Now that we are on the north side of the Gulf and once more at the foot of Aracynthus, it will be worth while to ascend the mountain a short way, either up the Grand Gorge, or, better still, up the Little Klissoura, to observe a few more of the very singular nests of *Sitta syriaca* and *Hirundo rufula*. Scrambling up the dry water-course at the bottom of the Little Klissoura, we may notice in several places the nests of the former plastered to the face of the cliff. Most of these are old, and probably all but one or two inaccessible without a rope. Where the nest does not include a natural cavity of the rock, it is glued very tightly to the face of the latter, being fully exposed without any attempt at concealment, though very difficult to distinguish from the numerous ants' nests, to which in outward appearance it bears a strong resemblance. It has generally a southern aspect. The outside appears to be stuck over with the wings of insects worked up along with the mud composing it, which becomes very hard after exposure. *Hirundo rufula* is still more singular in its nidification, always fixing its nest under a cave or projecting slab of rock. In the Little Klissoura and throughout the precipices of Aracynthus there are plenty of these caves, in former times a convenient refuge for the Klephts, as they now are for the shepherds tending their flocks during the winter months. This eccentric swallow, not satisfied with having a good dry cave all to himself, must needs construct a long passage to his nest, thus giving it the shape of a retort with the upper part cut away, and the remaining portion glued underneath a flat surface. The entrance is narrow, but the passage gradually widens, till it finally opens into a sort of chamber very warmly lined with feathers: here the little fellow and his mate are sure to be most snugly tucked in just after sundown, when they can't see to catch any more insects. Escape therefore is impossible when a ruthless ornithologist wishes to capture the pair for the sake of identifying their eggs. No more than one pair ever seem to occupy a cave, though the remains of previous

nests could occasionally be traced on the roofs. The same pair appear to return year after year; and their nest, unless injured by shepherd boys during the winter, will merely require a little touching up to render it again habitable. The fact of the same birds returning was proved by these caves being untenanted, where the pair had been captured during the preceding year. Several nests with eggs were found towards the end of May and beginning of June, 1859. Four seems about the complement: they are quite white, much resembling eggs of *Hirundo urbica*, which could be well passed off for them in collections.—*W. H. Simpson, in 'Ibis,'* ii. 385.

Habits of the Standard-wing.—The *Semioptera Wallacii* frequents the lower trees of the virgin forests, and is almost constantly in motion. It flies from branch to branch, and clings to the twigs and even to the vertical smooth trunks, almost as easily as a woodpecker. It continually utters a harsh croaking cry, something between that of *Paradisea apoda* and the more musical cry of *Cicinnurus regius*. The males, at short intervals, open and flutter their wings, erect the long shoulder feathers, and expand the elegant shields on each side of the breast. Like the other birds of Paradise, the females and young males far outnumber the fully plumaged birds, which renders it probable that the extraordinary accessory plumes are not fully developed until the second or third year. The bird seems to feed principally upon fruit, but it probably takes insects occasionally. The iris is of a deep olive; the bill horny olive; the feet orange, and the claws horny. I have now obtained a few examples of apparently the same bird from Gildo; but in these the crown is of a more decided violet hue, and the plumes of the breast are much larger.—*A. R. Wallace, in 'Proceedings of the Zoological Society,'* 1860, p. 61.

Young Cuckoo Fed both by a Song Thrush and Hedgesparrow.—A curious and interesting fact came under my notice a few days ago at Cattleshall, near Godalming. A young cuckoo had been caught in the garden and confined in a wicker cage, in which it was fed by a song thrush and a hedgesparrow, both of which birds had continued their attentions for about a fortnight, when the thrush abandoned the foster child to the exclusive care of the hedgesparrow. I have since learned that some juvenile thrushes had been confined in the same wicker cage, so that the thrush possibly supposed she was administering to the wants of her own progeny.—*Edward Sweetapple; Hurstbourne Mill, Whitehurst, Hants, July 6, 1861.*

On Certain Changes in the Plumage of the Pheasant.—A good deal has been previously written on those singular changes of plumage which are remarked in old specimens of females among the pheasant and other gallinaceous tribes, attributable in ordinary cases to the effect of age, sterility or other changes of constitution. In two instances within my experience a female of the wild breed of duck (*Anas boschas*) has assumed the plumage of the drake, one of which specimens will probably be exhibited to the Naturalists' Club on the occasion of this paper being read. Both these examples were known to be birds of considerable age. I shall not dwell longer upon these phenomena in the case of females, further than to state that I have sometimes, though rarely, observed in female pheasants, where no change of plumage had occurred, another attribute of the male sex in the appearance of spurs. These are always short, and more commonly are found only on one leg, but they are strong and sharp. A specimen shot last week of the hen pheasant, with the spur on both legs, is now in the hands of Duncan for preservation. These instances are more rare than that change of plumage which constitutes what is generally called by sportsmen "a mule bird." But besides these cases I have recently noticed in many instances a change in the plu-

mage of the male pheasant, which, as far as I know, has never yet been described by naturalists. This change is the converse of the former. In these cases the cock bird partially acquires the plumage of the hen. In a very peculiar example now before me, which was shot here some twelve or fourteen years ago, the scapular feathers, the wing coverts and the whole wing, the tail coverts and the tail itself, precisely resemble the female, and exhibit none of those brilliant colours and distinctive markings with which we are all familiar in the matured plumage of the cock pheasant. The plumage also of the belly is pale, and flushed with gray feathers. The bird, however, was killed at the end of the winter, when the plumage is in the highest order. It was quite alone, and at a distance from any of the coverts, as if it had been banished from society. Singular to relate, its very spurs partake of the character of the female, resembling rather those of an old domestic hen than the true attributes of the cock pheasant. It is a bird of great size, with a large allowance of the bare red skin round the eyes, a distinction which in no case is ever observed in the female, even where, in all other respects, her plumage has become that of the male. The description given of this individual specimen may be received as common to all these "androgynous" mutations, of which a great number have presented themselves to my notice in turning out the bags of the present season, in which scarcely any young birds escaped the disastrous storms of cold rain during the last summer. Every one of the more recent specimens were evidently birds of great age, and, unlike the example described, they all possessed very long and sharp spurs. Several gradations of plumage were observed, some partaking more, others less, of the female character.—*Right Hon. Lord Ravensworth* in '*Transactions of the Tyneside Naturalists' Field Club*,' vol. v. part 1, p. 38.

The Chinese Bustard, &c. — There is a Chinese bustard well known to sportsmen from Amoy and also to the northward, but which has not yet been systematically described, so far as I can learn. The following notice of it is from the '*Bengal Sporting Magazine*:'—"A species of bustard, somewhat like the common mottled English turkey, only smaller. These birds are generally found singly, at least during the time we were there (November and the winter months being the season in which we beat for them): they are exceedingly shy and difficult of approach, and are usually found in the long grass and fir-clumps; they seem to rise with difficulty, running a considerable distance preparatory to their taking wing, during which time they call and cackle, which seems extraordinary, as they are generally found as odd birds." Mr. Swinhoe is well aware of the existence of this bustard, but hitherto has been unable to procure a specimen, on account of the estimation in which it is held for the table. For the same reason, comparatively few skins of bustards are preserved anywhere, especially of the larger species; and so it happened that the great bustard of Australia, though met with even by Cook, and repeatedly mentioned by Flinders and other early navigators, remained unknown to European naturalists until Mr. Gould's visit to that country! Captain Cook, it may not be remembered, on his first voyage, proceeded northward from Botany Bay, landed a second time on the continent of Australia, a little to the south of the Tropic of Capricorn, and there he shot "a kind of bustard weighing 17 lbs.," and named the landing-place Bustard Bay! From a notice published in the '*Journal of the Royal Geographical Society*' for 1858 (vol. xxviii. p. 148), it appears that, "Of birds, the black and the white cockatoos, bronze-winged pigeons of various kinds, and the bustard (or 'wild turkey' of the colonists), were all found in the valley of the Victoria, but they were all much smaller than their kindred of the south." Probably, therefore, distinct species, according to

the common acceptation of the phrase, or such as would be figured as different species by Mr. Gould. In a collection of Chinese paintings of birds, among numerous species at once recognizable, was one of a very fine Bonasa, or "ruffed grouse," as yet undescribed. The collection referred to was taken to England by the late Viscount Hardinge.—*E. Blyth.*

Note on Struthionidæ.—In the 'Conspectus Ineptorum et Struthionum' of the late Prince of Cavino, published in the 'Comptes Rendus,' tom. xliii. p. 840-1, only one species of Casuarius is recognized, but a second Dromaius or Emeu, as *Dromaius ater*, *Viellot*, from "l'Isle Decrès," which would appear to be already extinct; while a third species, from the interior of Australia, with transversely barred plumage, has recently been brought to the notice of the Zoological Society. He also indicated a second ostrich doubtfully, as *Struthio épaosticus*, *C. L. Bonap.*, which is doubtless the northern race with smooth and poreless egg-shell. The two living species of Nandou, or Rhea (the threetoed American ostrich), are of course recognized; and at least three, if not four, living species of Apteryx; with no fewer than thirty-eight species, more or less satisfactorily made out, of Inepti and Struthiones of various zoological epochs; but the knowledge of the greater portion of these is vague in the extreme, and the Prince's bold attempt at classification of them will simply, as such, meet with approval. At the head of the Inepti he places the huge Epiornis of Madagascar, a fragment of the egg-shell of which I have recently received from M. Zill. This giant bird appears to have been first indicated (to Europeans) by the missionary Ellis, though not scientifically brought to notice. The natives of Madagascar imagine that the eggs of the Epiornis are those of some huge Saurian.—*Id.*

Notice of the Breeding of the Tufted Duck (Anas fuligula) in Northumberland.—In the year 1858 Sir Walter C. Trevelyan, Bart., informed me that a small duck had reared its brood, consisting of eight or nine, on a pond near his house at Wallington. Sir Walter again informed me, in the early part of the following year, that the same sort of small duck which had bred at Wallington the previous year was on the pond again. During May of the same year, I paid a visit to Wallington, and immediately on my arrival I strolled down to the pond to ascertain if possible what species of duck it was. I was not there many minutes before I observed two small ducks on the water at the far side of the pond. With the aid of a small telescope I soon discovered that they were tufted ducks. The male was in full plumage; he carried his flank feathers quite over the wing, which gave him a very odd appearance, in fact the white almost met over the back. It was clear that they were also breeding this year, for they would not leave the water unless driven from it. I remained at Wallington from the 24th of May till the morning of the 28th, and during that time made many searches to find the nest, but without success. I had the satisfaction, in company with Sir Walter and Mr. Wooster, of observing the birds each day. The pond is surrounded with high trees, and between the trees and the water's edge there are clumps of rhododendrons and other evergreens. At day-break of the 28th Mr. Wooster and I visited the pond for a final search before I left. We thought by going early we should surprise the duck on the eggs if she were sitting. We were disappointed, however, to observe her swimming about as usual with her mate, and were therefore perfectly satisfied that she had not yet commenced to sit. I left, however, quite assured that I should soon have the satisfaction of hearing from Wallington that the nest had been found, as it was evident, from the limited nature of the locality, it must be ultimately discovered. Accordingly, on the 21st of June, I received a letter from Sir Walter, stating that the

tufted duck's nest had been found, and I cannot do better than quote the letter, which is as follows:—"I will to-morrow send you, by carrier, an egg of the tufted duck, whose nest we have at last found, with nine eggs in it; it is among sedges and willows, made of sedges, and a slight lining of down. The male disappeared about a fortnight ago, and left his mate to bring up her family alone, as she did last year, when he was never seen, and I hope she will succeed as well this season, and that we may look for more of the family to breed with us another year." I had afterwards the satisfaction of seeing the nest; it was placed on a small island, near the middle of the pond. Last year (1860) three made their appearance on the same piece of water—one male and two females. I was at Wallington from the 17th to the 19th of May, and saw them all three, but could not find the nest. This is not the first account given of the tufted duck breeding in England. In the 'Zoologist' for 1850 (Zool. 2879) is a notice of a brood in Yorkshire, and in the 'Zoologist' for 1854 there is also an account of of the birds nesting at Osberton, in Nottinghamshire. My friend, Mr. Alfred Newton, of Elveden, says in a letter which I had the pleasure of receiving from him, that "in 1851 my brother Edward and myself were staying with our cousin, Lord Galway, at his place in Nottinghamshire, and the bailiff, a most intelligent man, told us of a pair of tufted ducks which, for the last two or three years, had frequented the water there (at Serlby), and hatched their young on an island." Thus, it appears, we have four well-authenticated instances of the tufted duck breeding in England.—*John Hancock, in 'Transactions of the Tyneside Naturalists' Field Club, vol. v. part 1, p. 40.*

The Cormorant out for a Tour.—I have this day been favoured with the sight of a cormorant, which, strange to say, was shot at Ten Stanton, Huntingdonshire, by Mr. Mosely. This denizen of the sea was resting upon one of the above gentleman's out-buildings, and so odd a bird created, as might be expected, some little speculation and wonder. It was sitting in an upright position, and its entire contour presented something particularly unusual to persons not versed in Ornithology, coupled with the situation being distant from the sea some hundred miles. I have myself known of similar instances of the cormorant being shot inland, but in every case during a tornado or in the winter months. This specimen is a last year's bird.—*S. P. Saville; Dover House, Cambridge.*

Occurrence of the Hawk's-bill Turtle (Testudo imbricata) at Banff.

By Mr. THOMAS EDWARD.

I HAVE just had the very great pleasure of receiving, from the Right Hon. the Earl of Fife, a magnificent specimen of the above reptile, accompanied by the following note:—

"Caught in a stake-net about three miles from Mount Duff, on Monday, July 29, 1861.—To Mr. Edward, Banff, with the Earl of Fife's compliments.—Duff House, Tuesday, July 30, 1861."

On inquiry I find that the place where it was taken is called Greenside, a spot not far from the promontory known as Gamrie Mhor, and is on the Earl's property. From this latter circumstance, I believe, and from the novelty of such a creature being taken there,

it was at once despatched to his Lordship by the overseer of the fishings. It was alive when found; and the fishermen were not a little astonished at their capture, which they concluded to be a "monster tortoise." His Lordship too, I believe, was not less surprised than its captors, and expressed himself highly delighted with his present. For myself I cannot sufficiently express my estimation of the gift, or my gratitude to the noble donor for his kindness.

I never saw this species before; but I believe the present specimen to be in every way a very good representative of its race, and as such I venture to give a very brief summary of its appearance and dimensions:—

Above the shell is of a fine mahogany colour, with lightish streaks or veins throughout the whole of the plates, which give it a marbled appearance. The animal itself, or at least that portion of its skin which is seen from above, is mostly of a brownish tint; underneath it is altogether of a most beautiful yellow, as also are the sides of the neck. The mandibles, if I may so speak, are of a horny hue and texture, and are very strongly and very thickly serrated. Shell 15 inches in length, 10 in breadth; of course it tapers considerably towards the extremities. Fore fin 10 inches in length; breadth from the tip of the fore fin to that of the hind fin 27 inches: hind fin $5\frac{1}{2}$ inches in length, $15\frac{3}{4}$ in breadth. Head 4 inches in length, $10\frac{1}{2}$ in girth; neck about the same dimensions. Tail about 2 inches in length.

This is the first specimen of the kind I have had an opportunity of dissecting, and I must say that I was well repaid for my labour. I will not trouble the readers of the 'Zoologist' with details of the dissection; but there is one thing to which I wish to call attention. From what I had read I expected to meet with some cartilaginous protuberances in the throat; but on examining this purse-like passage I was surprised to find it, from the entrance to from four to five inches down, very thickly and very strongly beset with ivory-looking spines, inclined downwards, but movable in any direction. I expected to find a rough passage, but had no idea of meeting with such a host of long, thick spikes, most of them being about an inch in length, and all as sharp as pins, the points having a coppery look.

Has this species ever been met with before in the British seas? and if so, when and where? I should feel greatly obliged for information on the subject.

THOMAS EDWARD.

Banff, August 1, 1861.

PS.—I learn that another specimen of the above species has been taken, also in a salmon-net, at a place called Pennan. Pennan is in Aberdeenshire, and only a few miles from where the first was caught. This one, I believe, has been kept alive, and its captors are astonishing the natives, who are flocking from far and near to see the “rare fish.”—*T. E.* ; August 17.

On a Spider (Neriere errans) inhabiting Coal Mines.—During the commencement of last year my attention was directed to the immense sheets of web-like material which abound in the “waste” or old workings of the Pelton Colliery. These webs attain a most gigantic size, some of them having been seen upwards of twenty or thirty feet in length, by four or five in height, and some even more, and they all, in consequence of the coal dust with which they are densely covered, present an opaque blackish appearance. I was informed that they had generally been considered to be the mycelium of a fungus, but not feeling at all convinced of this I determined to subject them to a more rigid examination than they had yet received. For this purpose, in February, 1860, I descended the pit with two of the wastemen, from whom I learned *en route*, and soon afterwards ascertained from actual experience, that, however interesting a subject they might be to the naturalist, they formed most disagreeable impediments to the progress of any one passing through them; these men also assured me that they were, in their opinion, not Fungi, but most certainly spiders’ webs, and that furthermore they had often seen minute spiders engaged in spinning them. This fact was completely verified on our arriving at the *locale* where the webs were the most plentiful, as I at once detected on them scores of small spiders, some busily occupied in the fabrication of the webs, and others rapidly dropping to the ground on our approach. By subsequent and more extended observations I remarked that these insects are eminently gregarious, assembling in large numbers to construct fresh webs, or to repair any rents or damages in the older ones, and also that their continual abode in the total darkness of the coal-pit does not seem to have deprived them of their susceptibility to light, as on the approach of the lamps they may be seen scampering about in great agitation, and dropping from their webs to the floor of the galleries. Would it not be an interesting problem to solve, whether, after the total absence of light for several generations, as it must frequently happen, their eyes still retain the same faculty of transmitting the image of objects to the retina as they possessed before their conversion into “miners,” or whether their apparent commotion derives its origin from some other sense than that of sight?—*David P. Morison*, in ‘*Transactions of the Tyneside Naturalists’ Field Club*,’ vol. v. part 1, p. 49. [The reader is referred to a previous record of Mr. Morison’s interesting discovery, by Mr. Meade, in the ‘*Zoologist*’ for 1860 (Zool. 7146). —*Edward Newman*].

Note on the Irish Zygænæ.—The remarks of my friend Edward Newman (Zool. 7676), respecting the Irish Zygænæ, will no doubt lead many of the readers of the ‘*Zoologist*’ to suppose that M. Guenée has examined a number of specimens, and

considers that two species have been confounded under the name of *Z. Minos*. This is not the case: he has only seen two individuals which I sent him some years since. In a letter to me, dated May 25th, 1861, he says: — “ I have examined with great attention an Irish *Zygæna* which you sent me some time ago, and which I regarded as a simple variety of *Z. Minos*. The two individuals which I received from you are identical with those which I took in 1858, at Bourg d’Oysaurs (Hautes-Alpes), and also with two specimens which I have received from the mountains of the Tyrol. I am now inclined to regard this *Zygæna* as a separate species, proper to mountainous countries. It differs from the typical *Minos* in the border of the inferior wings, and especially by their internal angles, which are tipped with dark gray; by the red spot upon the superior wings, which extends as far as the cellular bifurcation; and lastly, by the body, which is more hairy, and of dark brownish black instead of blue. This *Zygæna* flies in the open fields of the mountains, and does not appear to seek shady places as *Minos* does with us. It is known in Germany by the name of *nubigena*; and although this name is bad, I believe we must adopt it, in order that we may not introduce confusion into this genus, already so difficult.” I have thought it right to give the remarks of my friend in his own words. Whether the Irish *Zygæna* is anything more than a local variety of *Minos* time may perhaps prove. — *Henry Doubleday; Epping, August 19, 1861.*

Zygæna Minos in Scotland. — You ask (Zool. 7676) for information concerning the occurrence of reputed *Zygæna Minos* in East and West Scotland. A short time after writing my papers on the geographical distribution of *Sphingina*, finding Messrs. More and Stainton both very suspicious of the eastern locality, I wrote to the party who had taken the insect (R. Thomson, Viewhill *via* Kairn). He informed me that, not having the ‘Manual’ when he took the insect, he got a friend to name it, but that it turned out to be only *Z. Filipendulæ*. About the same time I had two or three letters from Mr. A. Somerville, of 328, Renfrew Street, Glasgow. He had unfortunately given all his *Z. Minos* away; but he writes: — “When in Oban, in 1854, though not a very scientific entomologist at that time, I met with two species of insects which my brother and I assigned as moths, though one looked more like a Hymenopterous than a Lepidopterous insect. These species were *Zygæna Minos* and *Procris Statices*. The former was quite distinguishable from *Z. Filipendulæ*, having an elongated blotch instead of several spots. The way in which I afterwards found that it was *Z. Minos* and nothing else that we had found was from the ‘Annual’ for 1855, which I did not see until some time after it was published; but in the plate for that year I recognize the Oban insect.” If you consult the back volumes of the ‘Intelligencer’ (vol. vi. I think), you will find a note by Prof. Wyville Thomson, of 6, University Terrace, Belfast, stating that he also met with *Z. Minos* in West Scotland. While on this subject I may mention that I am positive *Zygæna exulans* will turn up in Scotland some day. It occurs from the Pyrenees to Lapland, and the elevation at which it occurs in South Europe is the same as that of *Erebia Cassiope*, viz., 6000 feet. I do not think any of the Lapland mountains at all approach that elevation. — *William F. Kirby; 33, Mornington Crescent; July 31, 1861.*

[Believing this to be a fair summary of the existing evidence on the subject, I think every reader will consider it insufficient to establish *Z. Minos* as a Scotch insect. *Z. Filipendulæ* occurs in all parts of Scotland, often having the elongated red blotch instead of several spots, and still more often denuded of its scales, and having the semihyaline appearance of *Z. nubigena*. — *Edward Newman.*]

Larva of Clostera anachoreta. — In my description of the larva of *Clostera anachoreta* (Zool. 7681) I have said that Mr. Cooper was not aware of the value of his capture until the perfect insect emerged. My friend Mr. Doubleday writes:— “Sidney Cooper was not aware that the insect which he bred was *C. anachoreta* until, some time afterwards, he saw my specimens of *C. curtula*, which he said were different from the insect he bred, which therefore was no doubt *anachoreta*.” I exceedingly regret to find that I have annoyed a very liberal entomologist by saying the localities given for this insect were “calculated (if not designed) to lead our assiduous larva-hunters astray.” When I wrote this I had no doubt that the vague definition “home counties” was designed to put our exterminating dealers “off the scent,”—a design, by the way, I considered highly praiseworthy. I now, however, most cheerfully withdraw all that I wrote on this species, save and except the description of the larva.—*Edward Newman.*

Description of the Larva of Acronycta Alni.—The larva of this scarce species has an appearance remarkably striking and conspicuous. One was brought me on the 3rd instant. It was found reposing on a leaf of the common dock by the road-side, under a hedge the principal part of which consisted of sloe bushes, in an open part of the country, where the trees were but few and far between and vegetation in general exceedingly scant; about as unlikely a spot, altogether, to produce the species as could well be conceived, the nearest wood—in which, by the bye, I took a specimen of the perfect insect at sugar five years ago, a fact recorded in the ‘*Intelligencer*’ for 1856, p. 109—being about two miles distant. Sloe it refused to touch, as well as elm, sycamore, sallow, willow, bramble and wild rose, passed without notice over oak, ash and hazel, but seized upon a leaf of hawthorn, which it began eagerly to devour, relinquishing it to feed on alder, when a leaf of the plant was presented to it. That this, however, could not have been the kind of food it had been subsisting on previously is clear, from the fact that the plant does not occur nearer the spot than at the wood alluded to above. On the 7th it began to spin itself up among the upper leaves of the plants I had placed at its disposal, although a bed of loose mould was underneath in which it might have buried itself had it chosen to have done so. This larva does not appear to be up to any particular dodge on being disturbed, such as falling down as though suddenly attacked with epilepsy, or putting on the semblance of death, but will bear handling without manifesting much uneasiness or exhibiting signs of great annoyance. The head is moderately broad, intensely black and glossy: body intensely black, but not glossy, of uniform size throughout: legs, like the head, glossy black. Down the back a row of large oblong spots, placed transversely, of bright yellow (bordered in my specimen with white). From each side of each segment of the body springs an object, long, slender and flat, more resembling a fine thin strip of whalebone than a hair or bristle, each of which has a spade-like termination; like the head and legs these appendages, which render a mistake in the creature’s identity next to impossible, are glossy black.—*S. Stone; August 10, 1861.*

Occurrence of Leucania Elymi in England. — The *Leucania* announced on the wrapper of the ‘*Zoologist*’ has been identified by M. Guenée (to whom Mr. Doubleday was kind enough to send one of the specimens I captured) with *Nonagria Elymi* of Treitschke. I must beg to say that the honour of first capturing the insect in England is due to Mr. Winter, though I believe he only preceded me by some three or four minutes. Its habits are very retired, and I saw none at dusk, though its light colour would render it conspicuous.—*G. R. Crotch; Weston-super-Mare, August 21.*

Description of the Larva of Miselia Oxyacanthæ.—Does not roll in a ring or feign death when disturbed. Crown of the head slightly notched; body cylindrical, but exhibiting the segmental divisions very manifestly: back of the 12th segment raised, but scarcely humped, bearing two pairs of small warts, the posterior pair wider apart and rather larger than the anterior pair: colour brown-gray or red-brown, very dull; the back of each segment has four white dots: belly gray-green, with a conspicuous black median stripe: legs and claspers green. Feeds on *Cratægus Oxyacantha* (whitethorn), and is full fed by the end of May, when it spins a thick cocoon on the surface of the earth, and changes to a pupa, from which the perfect insect emerges in September and October. I am indebted to Mr. Thomas Hockett for this larva.—
Edward Newman.

Life-Histories of Sawflies, translated from the Dutch of M. Snellen Van Vollenhoven. By J. W. MAY, Esq.

(Continued from p. 7573).

ALLANTUS TRICINCTUS, *Fabr.*

Fabr. Syst. Piez. 30, 5. *De Geer, Mémoires*, ii. 2, p. 234, tab. xxxiv, figs. 9—19. *Hartig, Blatt. und Holzwespen*, p. 288, No. 7. *Brischke, Blattwespen-larven*, 1e Lief, S. 15, Taf. iii. fig. 5.

Allantus niger, articulo primo antennarum fulvo, fascia eborina ad basin clypei, abdomine atro fasciis tribus anoque flavis.

The larva, as well as the perfect insect, of *Allantus tricinctus* has already been known for some time, and if it had been our intention to describe those species only which were wholly unrecorded, or of which the last stage only was known, we should not have included this or the two following species; but as we intend, if the wish be not too bold, to describe in time every species of our indigenous sawflies, we must not exclude those which have already been observed in two or three stages of development, the more so that even of the greater number of these good natural figures are wanting.

We find the larva of this species was first described by De Geer, in his 'Mémoires' (we quote the German translation of this work by Johann August Ephraim Götze, Neurenburg, 1778—1783). He found it in this country in August and September on the leaves of the honeysuckle. After him it was described by Hartig and Brischke. I have also in my possession a description in manuscript by C. B. Voet, a painter who resided at Zwolle. The larvæ do not live exclusively on the leaves of the honeysuckle (*Lonicera*); they are also found on the jasmine,

seringa, snowberry (*Symphorecarpus racemosus*), guelder rose (*Viburnum opulus*), and on young ash trees. They remain on the upper or under sides of the leaves during the whole day, until the commencement of evening twilight, almost motionless, and rolled up in a spiral form, as shown in our first figure. In the evening they wake out of their day sleep, and begin to feed.

I have always met with it nearly full grown, and this seems to have been the case with former observers, excepting De Geer, who says that his larvæ underwent frequent changes of skin, although he does not record whether any difference in outward appearance, except as to size, was observable during their progress to maturity. Brischke also observed the larvæ when young. According to this author they are then covered with a sort of bloom of a blue colour, and have black heads, while the marks on the back appear as small black triangles.

The larvæ have twenty-two legs, the fourth segment only being apodal. The head is shining, of a bluish black-brown colour; the parts of the mouth are pale brown; the eyes black; the head completely covered with very fine white hairs. The colour of the skin varies in different individuals, being generally gray, sometimes dull green, also light purple, always with dark purple velvety markings on the back, one on each segment, except the last. On the first segment this spot is oval or elliptical, and is divided in the middle by the dorsal vessel showing through. On the next segment the spot is triangular, with the apex towards the head and the base towards the tail, the base having two curled processes, between which are generally found two small lighter-coloured round spots. Above the legs is a longitudinal stripe, darker than the ground colour, and in this are placed the brown elliptical spiracles. The legs are of a redder tint.

I have no record of the number of times the larvæ change their skin. After the last moult they become pale ochreous-yellow, and more shining than before; the dark-coloured head assumes a red hue, with a pale brown spot on the crown; the triangular spots on the back are then scarcely perceptible. For this reason we are obliged to point out the inaccuracy of Brischke's fig. 5 c, which represents the insect subsequent to the last moult, but in which figure the triangular markings are quite as distinct as, if not more so than, in the others. Having arrived at this stage, the larvæ do not feed any more, but seek a suitable place in which to undergo their change.

The larvæ of *Allantus tricinctus* attain a length of 1 inch or 28 mm. Brischke states that upon being touched they emit from the mouth a brownish green fluid of a very fœtid odour. I do not deny the correct-

ness of this, but have never observed it myself; I am only aware that they emit a greenish fluid from the mouth, with which they stick together grains of earth, and so make an oval cocoon in which to undergo their metamorphosis. This commonly takes place in September, in favourable seasons during the second week; if the weather is unfavourable at the end of that month, sometimes even in October.

The larva remains in the cocoon during the winter; it then gradually becomes shorter and thicker, the head sinking more between the six fore legs, which increase in length, the remaining legs gradually disappearing. The last moult does not take place until the beginning of June, when a red-coloured shining pupa is produced, in which the colours of the perfect insect are gradually developed. De Geer's observations concerning this pupa are very noteworthy, as also the manner in which he observed its passage from the larval state, and his remarks upon the subject.

The imago appears in the month of June of the following year. It is by no means a scarce insect with us, and has been observed in many different parts of the kingdom. On warm days and in the bright sunshine it appears very quick in its movements, but like most of the other *Tenthredinidæ* it is by no means shy.

The males occur less frequently than the females. The former are 11 mm. long from the head to the anus, the latter 14 or 15 mm., and expand 28 mm. The head is black, granular, punctate and covered with short hairs; eyes black; ocelli ruby-coloured. The first joint of the antennæ is testaceous or yellow, the remaining joints black; the antennæ themselves are shorter than the head and thorax; the third joint is the longest, the sixth the thickest. A milk-white, somewhat curved transverse line runs across the clypeus; the mandibles are light brown with black tips. The thorax is coarsely punctulate, pubescent, black; two yellow stripes run from the middle of the prothorax to the insertion of the wings, which is covered on either side with a brown tegula. Just above the coxæ of the third pair of legs is a round ivory-white spot. The scutellum is perceptibly raised. The abdomen is shining bluish black. The first, fourth and fifth segments have a yellow border. In some specimens small yellow spots are found on the sides of the third segment, and in some females on the sides of the sixth also. In the middle of the hind margin of the seventh segment is a semilunar spot; the eighth segment in the male is black, with a yellow spot in the middle; in the female the eighth and ninth are yellow. The wings have a pale brown costal nervure and stigma; a brownish blue-black spot extends over the

marginal and submarginal cells. Coxæ black; trochanters yellow; femora more or less spotted with yellow and black; tibiæ and tarsi reddish yellow or light orange.

The saw and ovipositor of the female are long and slender, both somewhat curved, especially at the basal extremity. The saw is marked off by transverse lines into about twenty divisions, of which the foremost have one rounded tooth and the basal two; those divisions which are furnished with two teeth have also little longitudinal folds (see figs. 6 and 7).

The manner of oviposition, as also the shape and colour of the eggs, I have not observed. From what has been stated above it clearly appears that this sawfly has only one brood in the year.

CLADIUS VIMINALIS.

Fallen, Kongl. Vetensk. Acad. nya Handlingar. t. xxix. p. 117. Hartig, Fam. der Blatt. und Holzwespen, p. 177 (C. eucera, Mus. Kleg.) Bouché, Naturgesch der Ins. S. 140. Lepel. de St. Fargeau, Monogr. p. 61, No. 179 (Nematus grandis). Ratzeburg, Forstinsecten, iii. p. 129, Taf. iii. f. 9. Brischke, Blattwespen-larven, 1 Lief. S. 9. tab. ii. f. 1, a, b.

Cladius fulvus, capite, thoracis dorso, scutello et macula pectorali nigris, tarsorum articulis fuscis, basi fulvis, alarum stigmatibus fulvo.

From the above references it will be seen that this sawfly has been by some authors placed in the genus *Cladius*, and by others in *Nematus*. The neuration of the wings, however, will show that it cannot be ranked in the latter genus, although at the same time the insect in question does not very well fit into the group of the ordinary *Cladii*; for not only does it differ in the shape of the saw and borer in the female, and in the parts of the mouth in both sexes, but the entire facies, the size and colour, have something that recalls the *Nemati*; and *Cladius viminalis* may properly be regarded as a form leading from one genus to the other. This species might thus be separated as a sub-genus of *Cladius*; but as I am very reluctant to add, without absolute necessity, to the thousands of existing genera and sub-genera, I shall continue to regard our insect as belonging to the genus *Cladius*.

I am acquainted with the larvæ of the five indigenous species belonging to this genus: those of the species about to be described are not rare, and are conspicuous, when full grown, on account of

their deep orange colour. In the middle of the month of July, 1844, I found some larvæ on a poplar at Zwammerdam; they were just out of the eggs, which were enclosed in the leaf-stalk. I was surprised at making this discovery at that particular season, as in the previous week I had seen perfect insects of the same species appear from the cocoons in my house. Probably the female by whom the eggs were deposited in the leaf-stalk had already appeared in the month of May, and it may be that the temperature of my room, which faced the north, had had some effect on the development of the insects.

The eggs were deposited on either side of the leaf-stalk of the poplar. The petiole was swollen on both sides, over and partially covering the eggs. I counted eight eggs on one side and ten on the other. The young larvæ, which were green with black heads, disposed themselves in a curved line on the under side of the leaf, the head being turned towards the point of the leaf; they consumed the lower epidermis and parenchyma only. After the second moult the yellow colour began to show itself on the first and penultimate segments, and the black spots became visible. Fig. 1 on plate 10 represents the larva after its third moult; the head is then pitchy brown; the body sea-green, excepting the first and penultimate segments, which are yellowish orange. A deeper green stripe runs along the back, and on the sides are to be seen black spots having the same position as in the full-grown larva, which is represented at our fig. 2. This latter is cylindrical, though larger round at the head than at the tail, and generally of a beautiful orange colour, but which in some individuals is tinged with green, especially in the middle of the dorsum. The skin is entirely covered with soft white hairs, which, when submitted to the microscope, appear to be spinous. The head is compressed anteriorly, the ground colour is pale brown, but, being covered with hundreds of minute black points, the whole head has the appearance of being black. The jaws are yellowish. The labrum is heart-shaped, notched at the anterior margin; the mandibles are much curved, and provided with one large tooth and three small ones; the maxillæ consist of two parts,—one broad and membranous, to which is attached the five-jointed palpus, and having first two and then seven long narrow teeth or projections; the other part of the maxilla is narrow and corneous. The labium is broad, wavy at the margin, and has two three-jointed palpi. The prothorax and the two last segments of the body have a round or sometimes square spot on either side; on the other segments is a similar spot, only larger and having a smaller spot below it; above the anus is a pretty large cen-

tral black spot. The larva has altogether twenty legs; these are orange-coloured, with darker indentations at the joints, and having brown claws to the thoracic legs. The greatest length of the larvæ is 20 mm.

My larvæ fed upon the leaves of the Italian and Canadian poplar (*Populus monilifera* and *P. tremula*) until the end of August. According to Bouché they also feed on the leaves of *Populus balsamifera*. They live in company, and keep on the under side of the leaf, afterwards eating the edge. In the last week of August and the first week of September they descend from the trees, when they spin up in cocoons among the fallen leaves or in the crevices of the stems. These cocoons are very thin, of a yellow colour and shining. Although these cocoons are very thin, they are composed of two layers, the outward one somewhat coarser, the internal layer very fine. They are yellow or light brown, and shining as if varnished.

They remain enclosed without change until the beginning of June. At that date my larvæ cast an exceedingly thin skin, and changed into orange-yellow pupæ, as represented in fig. 3. Strictly speaking the body only was orange; the head, antennæ, legs and wings being yellow; the eyes are black. These pupæ are probably paler at first, becoming gradually deeper coloured. After shedding this last skin they bit open the cocoon, having become imagos, and sought the daylight and the warmth of the sun.

Fig. 4 represents a female of this species magnified nearly three times. The outward distinction between the sexes consists in this,—that in the female the abdomen is larger, more especially thicker, and that the males have a little knob on the under side of the third joint of the antennæ; also their antennæ are somewhat thickly clothed with short hairs, which, as well as the little knob, are wanting in the antennæ of the female. *Cladius viminalis* differs from the other indigenous species of *Cladii* in the form of the upper jaws, which, after the large terminal tooth, have two smaller teeth, instead of being notched like a saw.

The imago is 9 mm. long, expanding to 16 mm., and orange-yellow; only the head, the prothorax (with the exception of the pronotum), the back, and a spot on the breast are shining black; the antennæ are brown on the upper side, dirty yellow beneath; the palpi are yellow, and the terminations of the joints of the tarsi brown. The wings are a light reddish yellow, which vanishes towards the apical margin; the costal cell alone is bright yellow; the stigma is black-brown towards the base, and yellow towards the apex of the wing;

the nervures bounding the interno-medial cell are orange, all the others brown.

The saw of the female, represented at fig. 5, is short and compressed, as in the other Cladii, but is, on the other hand, but feebly dentate, and the corneous plates have no serratures on their sides, so that this instrument is only used as a saw, and not as a file, at the same time. The ovipositor has much the same appearance as that of the other Cladii.

Note.—The author informs me that since the above was written a parasite, *Tachina* (*Degeeria*) *parallela*, has appeared from a number of these larvæ—*J. W. M.*

Capture of Sphærius acaroides, Hydrochus carinatus, &c., in the Fens.—While water-beetling in the Cambridge fens I had the good fortune to find a colony of the rare *Hydrochus carinatus* of Germar, in a small ditch about a hundred yards in length, and afterwards took one at Barwell. In the same fen I also secured a small Coleopteron, in a dry peat-pit; quite new to me, and which Mr. Waterhouse has identified with *Sphærius acaroides* of authors. I have no doubt that several specimens might have been taken, but its minuteness rendered the operation difficult in a gale of wind, which has been the normal condition of the weather this year wherever I have been. I also took *Ilyobatis nigricollis*, *Trichopteryx pilicornis* and *Hypocytyus discoideus*, &c., from bundles of sedge, together with the regular fen inhabitants. The waters were less crowded, and frequently their only tenants were *Corixæ*, which were very abundant, including, I think, fourteen or fifteen species, the only well-marked ones being *C. coleoprata* and one other. *Sigara minuta* was also abundant.—*G. R. Crotch; Uphill House, Weston-super-Mare, August 8, 1861.*

*On the Metamorphoses of a Coccus found upon Oranges.**—If the external surface of almost any of the sweet oranges be only cursorily examined, it will be found more or less spotted with small scales, the shields of a *Coccus*, or scale insect; they are adherent to the rind of the orange, but can easily be detached; and, on turning one of the larger ones over, it will be found, on examination under a low power, to present, as the most striking feature, a large accumulation of eggs lying beneath a cottony secretion; very frequently these eggs are in the process of hatching, and under such circumstances we have the insect in its larva state. The body is white, oval, and very flat: there are two antennæ proceeding from underneath; they are about one-fourth the length of the body, rather hairy, and of eight or nine joints, two very small light pink ocelli, or simple eyes, occur one on each side, at the very edge of the body, and about where the long curves of the oval commence; considerably below the antennæ is a proboscis, a long and apparently horny tube, proceeding from a conical base. These, with the exception of a few isolated hairs, are the only external organs of the head that are apparent. The legs are six in number, each consisting of, I think, four members; the terminal ones being provided with a hook, and two or more very small

* Read at the Microscopical Society of London, March 13, 1861.

suckers hardly to be distinguished from hairs. At the extremity of the body two exceedingly minute hairs trail behind for some considerable length; and besides these are numerous setæ and orifices, parts, I believe, of the organ for the secretion of the cottony substance and the hard shield. The locomotive power of the larva—and this is the only time it makes use of it—is I believe very limited; frequently it settles close to the parent home, and I imagine that when once the proboscis is inserted in the orange it is never removed; the insect thus located, the skin on the back changes to a darker colour, thickens, and ultimately becomes a cast skin, the coccus having retreated between the secretions of the hard shield, as a protection above, and the cottony substance as a close attachment below, but to neither of them is it ever adherent; at this stage it also loses every trace of antennæ, legs and eyes, whilst, on the contrary, the proboscis is more fully developed: this is evidently the pupa state, and thus far I have been unable to detect any difference between male and female. The first indication that I have found of the male insect is the presence of two dark and rather diffused spots in the head, and also a simultaneous disappearance of the proboscis. Then, after a skin is cast, there is an entire disappearance of the organs for the secretions of the shield, which is completed of a long and narrow shape; one more stage in advance and the ocelli are black and distinct, and there can be traced two long antennæ and two wings at the side; six legs are also in process of development, the two in front being directed forward, which is a peculiarity of the pupa of this genus; and at the extremity of the body is a protuberance I imagine to be the male organ. Another skin is yet cast, and there is a perfect male insect. The ocelli are four, two above and two below; the antennæ eight- or nine-jointed, very delicate, hairy, and nearly the length of the whole body; the legs have four members, the terminal one of each being provided with a single hook and two or more delicate suckers; the wings project considerably beyond the body, they are transparent, but covered with very minute hairs, and strengthened by a simple ribbing of two corrugations which unite at the base. The two halteres or poisers are oval, and terminate with a hair bent like a hook at the extremity; and that which I presume to be the male organ is long, attenuated, and attached at its base to, and immediately above, a truncated projection which has an aperture at its apex. We thus find in the male complete insect metamorphoses. I am unable to say as much of the female, though I presume that such must be the case, as only a perfect insect is capable of reproducing its species. I have not as yet paid much attention to this sex, but so far as my observations have gone, after it has changed into the pupa state all external organs disappear, excepting those at the extremity of the body, and the proboscis, which becomes stronger and larger; the secretion of the shield is continued until nearly four or five times the size of the male, and the body of the insect bears about the same proportion; it then deposits its eggs, between one and two hundred in number, which are placed on end in great regularity, and the first ones will frequently be found hatching before the last are laid. The external surface of the shield of the male gives very marked indications of the three changes that have taken place: first, there is the cast skin of the larva; secondly, the shield for the pupa; and thirdly, a thin and short addition to the shield for the wings of the imago, which I believe is lifted up when the insect escapes. There are also three similar indications on the external surface of the female shield, and these may also warrant the conclusion that its metamorphoses have been complete. It is somewhat surprising that these Cocci are to be found in a living state at all, after the change they must have experienced in the climate; it is, however, very

evident that the larva and pupa states are much hardier than that of the imago ; at least so far as the males are concerned, I have found it very difficult to obtain any alive after the external organs were fully developed. As it is, the circumstances under which they appear are very favourable to their examination ; one single orange, if well selected, will supply every condition I have mentioned ; and I imagine that, from the fact of the shield being such a complete protection, the metamorphoses are more distinct in their development than under the more ordinary circumstances where the insect itself is exposed. I have invariably used Mr. Wenham's biocular arrangement with the microscope, and I can only say that for this class of investigations the results are perfectly marvellous.—*Richard Beck.*

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

August 5, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘*Proceedings of the Royal Society*,’ vol. xi. No. 44 ; presented by the Society. ‘*Proceedings of the Zoological Society*,’ 1861, part 1 ; by the Society. ‘*Sitzungsberichte der Königl. bayer. Akademie der Wissenschaften zu München*,’ 1861, 1 ; by the Academy. ‘*The Natural History of the Tineina*,’ vol. vi. ; ‘*The Entomologist’s Weekly Intelligencer*,’ Nos. 248—252 inclusive ; by H. T. Stainton, Esq. ‘*The Zoologist*’ for August ; by the Editor. ‘*Anatomisch-Physiologische Untersuchungen über den Athmungsprozess der Insekten*,’ von H. Rathke ; by the Author. ‘*Die Metamorphose des Caryoborus (Bruchus) gonagra, Fabr.*,’ von H. L. Elditt ; by the Author. ‘*Schieften der Königlichen Physikolisch-ökonomischen Gesellschaft zer Königsberg*,’ Erster Jahrgang, Abth. 1 and 2 ; by the Society. ‘*The Athenæum*’ for July ; by the Editor.

Election of a Subscriber.

John G. Grenfell, Esq., of the British Museum, was elected a Subscriber to the Society.

Exhibitions.

Mr. Bowring exhibited a box of Coleoptera from Penang, including many interesting species of Longicorns, some remarkable Cetonidæ and Cassididæ, a new species of Paussus, &c.

Mr. Stevens exhibited a splendid series of Buprestidæ, from the neighbourhood of Adelaide, containing upwards of fifty species.

Mr. M'Lachlan exhibited drawings of the larvæ of *Eupithecia pusillata*, *E. dodo-neata*, *Charadrina blanda* and *C. alsines*, executed by the Rev. H. Harpur Crewe.

Mr. Stainton exhibited two examples of a *Noctua*, taken in the fens of Norfolk, at the end of June, by Messrs. Winter and Crotch, and which is believed to be the *Non-agria Elymi* of Treitschke, a species hitherto only found on the shores of the Baltic.

Mr. Fereday exhibited a singular *Polyommatus*, which he believed to be a hybrid produced from *P. Alexis* and *P. Ægon* ; also two fine varieties of *Tæniocampa munda*, found on sallow blossoms near Croydon.

Mr. Smith sent for exhibition, preserved in spirits, the example of *Aspidomorpha Stæ Crucis* which he had exhibited alive at the June Meeting of the Society, and communicated the following particulars respecting it. "This insect was fifty-six days on the voyage to this country, and lived for sixty days after its arrival, making in all one hundred and sixteen days, with no other nourishment than a little moisture. During the last week or ten days of its life the bright golden lustre became dull copper, or rather dull tarnished gold, but when I found it dead it had regained all its golden brilliancy, which it retains in the spirits."

Mr. Bond exhibited the sexes of a new species of *Gelechia*, allied to *G. pictella*, taken by Mr. Barrett on the sand hills, near Dublin, and for which Mr. Stainton had proposed the specific title of "*Tarquiniella*."

The President exhibited a specimen of a *Spilonota* allied to *S. dealbana*, but distinct from any recorded British species. He had recently casually captured this insect at Mickleham, and was informed that specimens of apparently the same species had been taken last season at Deal, frequenting fir trees, and that Mr. M'Lachlan had also taken and bred a similar species from larches at West Wickham Wood.

The President also exhibited the following Coleoptera and Hemiptera:—*Scryptia fusca* and *Abdera 4-fasciata*, from the Purley Oaks, near Croydon; *Myrmedobia coleoprata*, *Fallen* (*Anthocoris exilis*, *Fallen*), from Mr. Wollaston's collection, a rare species living with ants, and the sexes of which are so dissimilar that they have been placed in different genera; and *Microphysa pselaphoides*, taken in ants' nests by Dr. Power.

Professor Westwood exhibited two larvæ of *Æstrus hominis*, which he had received (by the hands of Dr. Hagen) from Count Osten-Sacken, Russian Minister at Washington, who had obtained them from Dr. Leconte, who had himself received them from Honduras. The larvæ clearly belonged to the family *Æstridæ*, but differed from the ordinary forms in the greater elongation of the narrow anterior parts of the body and the remarkably strong rows of reflexed spines with which the segments of the hind part of the body are armed. Many accounts have from time to time been published of the occurrence of larvæ, supposed to be those of a species of *Æstrus*, in the human body, but Professor Westwood recollected no instance of a description of the larva being published, sufficiently precise to allow of satisfactory identification. He had indeed been led to the belief that in these recorded cases (certainly so in that of M. Procé) larvæ of *Muscidæ* had been mistaken for *Æstri*, as it was not improbable that a blow-fly would deposit its eggs either in a slight wound on the body of a sleeping person, or upon the parts covered by a more delicate skin than the other parts of the body, or if the larva was really that of an *Æstrideous* insect some quadrupedal bot-fly, under pressure of a necessity for the deposition of her ova, might have accidentally been led to lay them upon a human body. The examination of the larvæ sent by Count Osten-Sacken seemed to prove that these ideas were erroneous, and that a bot-fly does exist distinct in its larva state from any hitherto described which is found in the human body.

(Since the exhibition of the specimens in question Mr. Bates has informed Professor Westwood that whilst on the Amazons he was attacked by one of these *Æstrideous* larvæ, which formed a tumour upon the calf of his leg, which suppurated, and the scar of which is still visible. He had also extracted one from the fleshy part of the back of a negro girl who helped in his house. He was induced to believe that the species was only an accidental intruder in such a position, and that it

was truly parasitic upon the howling monkeys, as he had killed one of those animals and found its body infested with a number of apparently the same kind of larvæ. What a curious illustration does this statement afford, if correct, of the relationship of man and the monkey !)

Dr. Knaggs exhibited a box of Australian Coleoptera, collected in the neighbourhood of Sidney by Dr. Pittar.

Dr. Knaggs also exhibited a series of *Nonagria* (?) *Bondii*, of which several specimens were females; and a specimen of *Acidalia strigilata*, for the first time in this country, bred by himself from the egg; also both sexes of *Acentropus niveus*, and made the following statements in support of the opinion that this species belongs to the order Lepidoptera:—“*First*, that it appeared from the beginning until the third week in June; that it then disappeared, or nearly so, for about a month, when it again made its appearance; which was precisely his experience of *Paraponyx stratiotialis*, &c. *Secondly*, that the eggs of *Acentropus* were laid on the setting-boards as, and had a most striking resemblance to, those of *P. stratiotialis* (eggs of both species were exhibited). *Thirdly*, that although its usual habit, when flying, was to keep close to the surface of the water, as *Psyche* does to land, yet, like *Psyche* also, he had occasionally seen it mount perpendicularly into the air, rising higher and higher until lost to sight. *Fourthly*, that when ‘boxed’ it rubbed its thorax in true Lepidopterous fashion.”

Mr. M'Lachlan and other members present remarked that the observations of Dr. Knaggs, relative to the flight of this species and its liability to injure itself when confined in a pill-box, would apply equally well to many of the Phryganidæ.

Mr. Shepherd read a letter from Mr. G. King, announcing the capture of specimens of *Leucania putrescens* at Torquay.

The Secretary read a communication from Lord Dunsany, dated from Navan, Ireland, August 2nd, 1861, accompanying specimens of the larva of *Biston hirtarius*, and stating that these caterpillars were first noticed in that neighbourhood in 1858, but in small numbers; in 1859 (a remarkably dry season) they were very numerous; in 1860 none were seen; but this year, the spring having been dry, they have appeared in immense numbers, and at the present time plantations of large ash trees are stripped of their leaves by them as completely as they would be in mid-winter.
—E. S.

Ants the Inventors of the Tubular Bridge.—When, on their line of march, the gray bashikouay ants of Equatorial Africa require to cross a narrow stream, they throw themselves across and form a tunnel—a living tunnel—connecting two trees or high bushes on opposite sides of the little stream, whenever they can find such to facilitate the operation. This is done with great speed, and is effected by a great number of ants, each of which clings with its four claws to its next neighbour's body or hind claws. Thus they form a high, safe, tubular bridge, through which the whole vast regiment marches in regular order. If disturbed, or if the arch is broken by the violence of some animal, they instantly attack the offender with the greatest animosity.
—*Du Chaillu's 'Explorations,'* p. 313.

Destruction of Small Birds by Farmers, Gardeners and others.

"Quem Deus vult perdere primus dementit."

[It is with great pleasure we see this matter at length obtaining attention from the enlightened government of France. The insane and suicidal policy of destruction is still rampant in England, and the loss of our gooseberries and turnips is the most striking result it has produced. Perhaps no pest, plague, murrain, blight or natural disease ever produced half the loss that is occasioned by the use of what is called poisoned wheat. It is the bounden duty of the readers of the 'Zoologist' to possess themselves of the facts of the case, and to use their powers of persuasion on farmers and gardeners engaged in this horrible task of extermination. The paper which follows is reprinted from the 'Times' newspaper of the 21st of August, and will explain itself without any commentary of mine.—*Edward Newman.*]

M. MARSHAL, ex-Deputy of La Meurthe, the Agricultural Society of Toulon, the Acclimatization Society of Nancy, and M. P. Schoeffer, of Robertsau (Haut-Rhin), have petitioned the French Corps Législatif, requesting that steps may be taken for the preservation of those birds that destroy insects detrimental to Agriculture.

"These four petitions (says the 'Moniteur') deserve the highest attention from the Senate.

"They are not inspired (says the Report), as might be supposed at a first glance, by a Platonic sentimentality in favour of a class of living creatures doomed to a destruction which does not legitimize for man the supreme law of his own preservation. However honourable and justifiable such a sentiment might be in the opinion of a sound philosophy, that is not the sentiment which inspires the petitioners. If practical and sensible men ask from you a more efficient protection for birds than is actually allowed by the law, they do not do so out of love for the birds; it is solely in the interests of Agriculture, very seriously endangered, that they affirm that men ought not to be allowed to continue to destroy the only auxiliaries which can effectually stop the propagation of insects, the bane of all cultivation.

"These petitions give rise to many questions of fact and right, which we will rapidly examine. As regards the first, in default of all personal competency, we have consulted, in so far as it was in our power and the time we could devote to it, the highest authorities in Natural History and Agriculture. It is, therefore, in their name, so to say, that we submit to you certain facts for affirming which we had

not the requisite qualifications. Moreover, let us say, *en passant*, that the importance of the right of petition is now so fully recognized by all classes, as admitted by the Senate, that our most important questions have been everywhere most favourably received.*

“ *Paragraph 1.—The Importance of Birds to Agriculture.*

“ 1. There exist in France, gentlemen senators, many thousand species of insects, nearly all of them endowed with fearful fecundity,† to the detriment of our most precious vegetables, those which provide food for man, wood for building purposes or burning.

“ The robust oak has for enemies the stag beetle and the *Cerambyx Heros*.

“ The elm is infested by the destructive *Scolytus*.

“ The pine and the fir succumb under the attacks of *Orgyia monacha* and *Bostrichus typographus*.

“ The tree of Minerva, the valuable olive, sees its wood perforated by the *Phlæotribus*; while its fruits are devoured by the innumerable larvæ of the olive fly (*Dacus oleæ*).

“ The vine in many localities can scarcely resist the ravages of the *Pyralis*.

“ Corn and other cereals are attacked in their roots by the white worm (larva of the cockchaffer); grown up, before the ear is formed, by the *Cecidomyia*; later, when the grain is formed, by the *Calandra granaria*.

“ Colza (rape) and other cruciferous plants have enemies no less numerous. Different varieties of *Altica* destroy the plant as it shoots up from the earth; other parasites wait till the pod is formed to take up their domicile therein and feed on the grain.

“ The roots of all vegetable substances are eaten up by snails and other insects, while the larvæ of *Bruchus* live concealed in peas and beans, only leaving the pod.

* * The reporter owes special thanks to M. Geoffroy Saint-Hilaire, and to his worthy colleague, M. Florent Prévost.

† The fearful fecundity of insects is one of the most established facts of Natural History. In one single *Phlæotribus*, so fatal to the olive, a naturalist counted 2000 eggs. In recent years to stop the ravages of the *nonne* an attempt was made in East Prussia to collect the eggs. In one day, in one single *verderie*, four bushels, or about 180,000,000, of eggs were collected. In another *verderie* of Upper Silesia, towards the Austrian frontier, in nine weeks 117 kilogrammes were collected, representing 230,000,000 to 240,000,000. — *Dr. Gloger, in an Article dedicated to the Cardinal Archbishop of Bordeaux, in the seventh volume of the ‘ Bulletin ’ of the Society for the Protection of Animals, p. 322.*

“Does what the insects have spared remain to the agriculturist? No; a multitude of moles, field-mice and rats, after having lived in the fields to the detriment of the harvest, enter the granary and levy a new tax upon it.

“Who could calculate the losses which result to Agriculture from all these united causes?

“It is only for a few years that Science has understood that it had a great social duty to fulfil; it is but yesterday, so to speak, that these questions have been studied; statistics, therefore, as yet, only provide incomplete *data*, which must not be quoted too hastily.

“Nevertheless, the complaints of the vine-growers attest the enormous extent of the evil in that particular branch of cultivation.

“As regards grain (*Cereal*ia), the amount destroyed in one single year in one of our eastern departments, by the larva of a *Cecidomyia*, is estimated at four millions of francs (£160,000).*

“In a special notice, and according to a great number of facts carefully studied, M. Bazin does not hesitate to attribute to this insect the insufficiency of the harvests from which we suffered so much in the three years which preceded 1856; in many fields the loss was more than half the crop.†

“As regards rape, a Report, very ably drawn up by one of the Professors of the old Agricultural Institution of Versailles, has shown, by most carefully made investigations on a crop belonging to that establishment, that on twenty pods taken by chance and giving 504 grains, only 296 grains were healthy; the remainder were eaten up by insects or destroyed by their contamination: that, consequently, there was a loss in oil of 32·8 per cent.; and more especially on a harvest which produced 4500 francs it was necessary to calculate a loss of 2700 francs, which, could it have been avoided, would have realized 7200 francs.‡

“In Germany, according to Latreille, the Black Arches moth (*Orgyia monacha*) has destroyed whole forests.§ In 1810 a species of *Bostri-chus* had so invaded the forests of Tannebuch, in the department of

* ‘Ami des Sciences’ of August 9, 1857.

† ‘Notice of an Insect which has caused the greatest Ravages among our standing Crops.’ Paris, 1856. 8vo, 32 pages, with plates.

‡ M. Focillon, ‘Des Insectes qui nuisent au Colza.’ Paris, 1851. 41 pages. 4to, and plates.

§ Latreille, ‘Histoire des Insectes.’

the Röer, that an order was issued to cut down and burn the forest—trees, branches, roots and brushwood.*

“In East Prussia, contrary to all forest rules, three years ago twenty-four millions of cubic feet of forest were ordered to be felled, because the trees were perishing from the attacks of insects.†

“Our admirals will give you much better information than we can respecting the Termites which, principally at La Rochelle and Rochefort, destroy the timber in our naval dockyards, and even the registers of the archives.

“However considerable these ravages are, it is surprising that they are not even greater when the prodigious fecundity of these injurious species is considered; and if God in his wisdom had not provided a remedy, vegetation would have disappeared from the face of the earth.

“2. In fact, against such enemies man is powerless. His genius may enable him to follow the course of the planets, to penetrate mountains, or steer a ship against a storm; he can kill or bend to his will the monsters of the forests; but in presence of these myriads of insects, which from every point of the horizon settle upon his fields, cultivated with so much care, his strength is sheer weakness. His eye is not even sharp enough to discern many of them, his hand too slow to catch them.‡ And even were he to annihilate them by millions they would reappear by milliards. From above, from below, from right to left, they come in legions innumerable, without relapse. In this invincible army, which advances to the conquest of the labour of man, each member has its month, its day, its season, its tree, its plant; each knows its own battle-ground, and never mistakes its post.

“At the beginning of the world man would have succumbed in this unequal struggle if God had not given him in the bird a powerful auxiliary, a faithful ally, who wonderfully accomplishes the task which man is incapable of performing.§

“This providential mission of birds for a long time was considered a poetical exaggeration; now, thanks to the labours of modern naturalists, and especially of M. Florent Prévost, assistant naturalist at

* Baudrillart, ‘Dictionnaire des Forêts V. Insectes.’ Gadirler, ‘Police des Chasses,’ page 172 and following.

† Dr. Gloger, Berlin, *loco citato*, page 322. M. Tschudi’s ‘Des Insectes et des Oiseaux,’ pages 14 and 15, quotes analogous facts no less remarkable.

‡ The *Cecidomyia* is a fly of two millimetres in length; the weevil five millimetres; the *Pyralis* twenty millimetres. As regards the eggs, they are almost imperceptible.

§ Buffon, quoted by Gadbled, page 178. Michelet, ‘L’Oiseau,’ *passim*.

our Museum of Natural History, it ranks as one of the best demonstrated truths of Science.

“ With the assistance and facilities given him by the administrators of the Crown lands and forests, and after a series of studies perseveringly followed for nearly forty years, this modest and learned investigator has succeeded in ascertaining experimentally, week by week, the alimentary system of the birds of our clime. By a careful examination of the remnants of food found in their stomachs he has been able to define, for each species, not only in what proportion they feed upon insects, but what particular insects they seek out and destroy, and consequently what vegetables they protect against their enemies.

“ The stomachs thus examined are preserved in a triple form ; they form the commencement of a new collection, which will rank among the most interesting in the Museum. In addition, M. Prévost has drawn up careful tables, which illustrate the results obtained.

“ Many of these studies, not yet made public, have more than once been brought forward by M. Geoffroy Saint-Hilaire, and have received the most honourable recognition from the Academy of Sciences and from other learned societies.* With a readiness, for which we are happy to have an opportunity of thanking M. Florent Prévost publicly, he has placed at the disposal of your reporter all his collections and drawings, and, what is more, that inexhaustible complacency of which our experiment stands so much in need.

“ We cannot think of submitting these interesting documents to the Assembly, but, should any of our colleagues express a wish to see them, we could add, in the printed Report, two or three of those drawings which would give an idea of the degree of certainty at which the skilful naturalist has arrived respecting facts which it seemed scarcely possible to ascertain.

“ From these remarkable researches it results that, in the point of view of the services rendered to Agriculture, the three hundred species of birds that lay eggs in our country may be divided into three principal classes :—

“ *Class 1.* In the first class we shall place the birds which are decidedly noxious, at least indirectly, as they destroy a number of insect-eating birds. They are, in the order of the birds of

* M. Geoffroy Saint-Hilaire, ‘ *Acclimatation des Animaux Utiles*,’ pp. 122 and following, and especially p. 125, note 2.

prey (*Accipitres*), nearly all of them diurnal;* and in that of the omnivorous, crows, magpies and jays.†

“ In this general proscription of these two malefactor tribes justice demands that an honourable exception must be made in favour of the common buzzard and the honey buzzard, each individual of which destroys annually about 6000 mice; ‡ and especial favour must be given to the rook and harvest crow, which render such valuable services in destroying the white worm, and which are easily distinguished from the other crow species by the metallic radiance on their plumage. §

“ *Class 2.* In the second class must be placed the granivorous birds, or, more correctly, the birds with double alimentation; for, with the exception of the pigeon, there is not a single bird in this class that is exclusively granivorous; all feed, according to the seasons, on grain and insects alternately. Detrimental in the first respect, useful in the second, there ought to be, according to M. Geoffroy Saint-Hilaire, a balance drawn between the services which they render and the damage they commit. || Such are sparrows and other finches. M. Florent Prévost and some other naturalists entertain a bolder opinion, and maintain that the good they do far exceeds the mischief, and facts seem to justify the opinion.

“ Of these suspected birds that which bears the worst character is doubtless the sparrow, so often pointed out as an impudent pilferer.

“ Now, if the facts mentioned in the petitions are exact, according to the opinion of many this bird ought to stand much higher than he is reputed. In fact, it is stated that, a price having been set upon his head in Hungary and in Baden, this intelligent *proscrit* left those countries; but it was soon discovered that he alone could manfully contend against the cockchaffers and the thousand winged insects of the lowlands, and the very men who offered a price for his destruction offered a still higher price to introduce him again into the country. ¶ It was a double expense—the ordinary punishment of hasty measures. Frederick the Great also declared war against the sparrows, which did not respect his favourite fruit, the cherry. Naturally the sparrows could not pretend to resist the Conqueror of Austria, and they

* * There are twenty-seven species of them.

† † Tschudi, ‘*Les Insectes Nuisibles et les Oiseaux*,’ pp. 25 and 26, Paris, 1860; Gloger, already quoted.

‡ ‡ Tschudi, p. 24; Gloger, p. 302.

§ § Gloger, pp. 305 and 307.

|| || Gloger, pp. 314 and 324. Geoffroy Saint-Hilaire, ‘*Acclimatation*,’ p. 125.

¶ ¶ M. Marshal, petition No. 152, and M. Dumast, petition No. 391.

emigrated; but after two years not only were there no more cherries but scarcely any other sort of fruit—the caterpillars ate them all up, and the great king, victor on so many fields of battle, was happy, at the cost of a few cherries, to sign peace with the reconciliated sparrows.* Moreover, M. Florent Prévost has shown that, according to circumstances, insects form at least one-half—often in a much larger proportion—the food of the sparrow. It is exclusively with insects that this bird feeds its young brood; here is a remarkable instance:—At Paris, where, nevertheless, the fragments of our own food provide abundant aliment for the sparrow, two of those birds having made their nest on a terrace of the Rue Vivienne, the elytra of the cockchaffers thrown out of the nest were collected; they numbered 1400. Thus one little household had destroyed 700 cockchaffers to feed one single brood.†

“Let us add, in favour of the discharge of this culprit, that the sparrow has become almost domesticated, inasmuch as he only lives near the domiciles of man, and, perhaps, like him, has been corrupted by excess of civilization.

“At Montville (Seine Inférieure) rooks had been doomed. It was soon found that their ravages could not be compared to those they prevented, and the rook was honourably re-established.‡

“*Class 3.* If the sparrows and the rooks make us pay for their services, there are other birds—and they are far more numerous—which render us gratuitous services. They are, first of all, the nocturnal birds of prey, as bats, barn-owls and others,§ which ignorance foolishly persecutes as birds of evil omen. Agriculturists ought to bless them, for, ten times better than the best cats, and without threatening the larder like them, the birds of this order wage a determined war against rats and mice, so detrimental to stacked corn or grain in barns, and destroy in the fields hosts of field-mice, moles and dormice, which without these night hunters would become an intolerable scourge.||

* Tschudi, already quoted, p. 19.

† A fact verbally stated to the reporter by M. Florent Prévost. See, moreover, M. Chatel, ‘Utilité et Réhabilitation du Moineau (Angers, 1858); M. Dupont, in the ‘Transactions of the Royal Society,’ ‘Bulletin de la Société d’Acclimatation de Nancy,’ 1859, p. 356.

‡ Baron Dumast, ‘Extrait du Bulletin de la Société d’Acclimatation de Nancy,’ 1857, pp. 10 and 11.

§ Baron Dumast, ‘Extrait du Bulletin de la Société d’Acclimatation de Nancy,’ 1857, pp. 10 and 11.

|| Gloger, in the work already quoted, p. 301, relates that in 1857, on a property near Breslau, in Silesia, 200,000 mice were caught in one week. A manufacturer

“ Pointing out the ravages committed by these little nibblers in the fields and plantations, Buffon gives an idea of how they multiply ; in three weeks he had caught more than 2000 in a plantation of 40 acres.* According to observations made by the English naturalist White, a pair of white barn owls destroy daily at least 150 little nibblers. Where is the cat that could give such a result ?† Let us add that it is these birds alone that can give chase to moths and nocturnal insects, many of which are most destructive.‡

“ Finally, gentlemen senators, but incontestably in the first rank for the service they render us, come the birds that live on insects only (*les oiseaux purement insectivores*),§ — creepers, woodpeckers, fern owls, the various species of swallows, but especially the charming songsters of the fields ; all these are insect-feeders, vulgarly designated under the collective expressions of *petits-pieds* or *becs-fins* — nightingales, thrushes, blackcaps, redbreasts, redstarts, wagtails, grasshopper larks, pewets and wrens, all of which vie with each other in rendering us inappreciable services, as gratuitous as they are badly rewarded, because their value is not properly estimated.

“ Allow me, then, to quote an example which M. Prévost gives respecting the martin. Ten of those birds were killed between the 15th of April and the 29th of August, at the close of day, as they were returning to their nests. The insects of which the remains were found in their stomachs amounted to no less than 5432, giving to each day for each bird an average of 543 insects destroyed. Another statement gives analogous results to the hedgesparrow, and among the insects thus destroyed figure precisely our most formidable enemies — the weevil, the *Pyralis*, the cockchaffer and a host of others.

“ You will easily understand, gentlemen, the mischief done by these insects if you call to mind that the cockchaffer deposits from 70 to 100 eggs at a time, which soon are transformed into white worms, which for two or three years live exclusively upon the roots of our most

there allowed one centime a dozen for them, and at that price the more skilful catchers earned 22 sols a day. They invaded the barns in such numbers that more than 2000 were killed in a small barn which had been cleared out to be cleansed.

“ * Buffon, ‘ Histoire Naturelle,’ tome viii., p. 328 and following.

“ † Tschudi, p. 23. ‘ Mémoire de M. Chatel de Pire.’ Lettre de M. Leroy Girardot au Journal du Loiret.

“ ‡ Tschudi, p. 23.

“ § In France there are sixty-nine species, of which twenty-five only are resident (*sédentaires*).

valuable vegetables. The weevil produces from 70 to 90 eggs, which, laid in so many grains of corn, become larvæ that eat them all up. Thus one single weevil destroys a whole ear of corn. The *Pyralis* lays from 100 to 130 eggs in as many shoots of vine. Thus attacked, the shoot pines and dies. From 100 to 130 grapes are thus destroyed by one *Pyralis* before their formation.

“And now, if you will compare the two orders of figures which I have just submitted to you, admitting that on 500 insects destroyed in one day by a single bird there be only one-tenth of those noxious creatures; for example, 40 weevils and 10 *Pyralis* (and this is below the mark)—that is to say, on an average, 3200 grains of corn and 1150 raisin-grapes (*grappes de raisin*), which in one day this little bird will have saved you.

“Give as large a margin as you choose to any other natural causes which might have stopped the ravages of these insects; reduce as much as you choose that of the bird, and there still remains enough to justify the profound saying of a contemporary:—‘The bird can live without man, but man cannot live without the bird.’

“And, in fact, who but the little bird could be continually looking out for and catching the weevil five millimetres in length, while depositing its eggs in a corn-field in the young, incipient grain? Who could catch the small moth when flying about with the same object in view?

“Who, especially, could find those minute eggs and larvæ of which one single titmouse consumes 200,000 in one year?*

“III. Doubtless grateful man has placed these indispensable auxiliaries, these friends and faithful allies, under his special protection; he, doubtless, has endeavoured to destroy the hostile species which wage war against them—the bird of prey that seizes them on the wing, the snake that glides into their nest to eat the young brood, and often the mother with the young ones. No, as if once more to justify the fable,

‘Mais trouve bon qu’avec franchise,
En mourant, au moins je te dise,
Que le symbole des ingrats,
Ce n’est point le serpent, c’est l’homme.’

Yes, man, who, by a strange blindness, shows himself the most terrible enemy of these gentle and useful creatures. More cruel than the kite and hawk, who kill to feed, he destroys them for the simple love of

* Gloger, p. 323.

destruction. The gun is not murderous enough ; it is, moreover, preserved for nobler game ; it is by all sorts of contrivances, such as nets, birdlime, traps, &c., that these charming and indispensable little friends are persecuted by man, to whom they were given by a wise Providence.

“ Gentlemen, I will spare you a description of these barbarous scenes ; but what I must point out to you is the disastrous number of useful birds which are doomed to destruction throughout the whole of France, especially in the Eastern and Western Departments.

“ As soon as the return of spring brings back to our lands, from the shores of the Mediterranean, those faithful allies which our winters had forced to emigrate, such is the reception they receive. In the vicinity of Marseilles and Toulon, and of other towns and villages of the coast, all the eminences are provided with implements for catching these birds ; and, on the testimony of a man worthy of belief who has specially studied the subject (M. Sace), during the few months this *chasse*, lasts 100 to 200 beccaficas fall daily to each *chasseur*.*

“ The petition of the Toulon Committee therefore exaggerates nothing when it affirms that those birds are destroyed by myriads on their passage, to the great detriment of our Central and Northern Departments, where they arrive in such small numbers as not to fulfil their providential mission.

“ In the Eastern Departments, especially in Old Lorraine, analogous facts are demonstrated, as shown in the petition of the Acclimation Society of Nancy.†

“ And wherefore this ‘butchery,’ as it is styled by the Toulon Committee ? Is the right of man to feed on animals to be invoked ? Surely it is not on such a plea that the destruction of these little creatures could be justified, each of which is scarcely a mouthful. Are these humming birds of the Old World, which are little more than a tuft of feathers, to be placed in the category of food—no, not food, but rather a coarse gluttony.

“ And yet, if it was calculated, even at the lowest estimation, how many sacks of corn, barrels of wine and oil are represented by a dish of these victims, it would be found that Lucullus in his full glory never gave so costly a repast ; and to find an example of such luxury we should have to advert to Cleopatra’s pearl.

* Letter of M. Sace, quoted by M. Geoffroy Saint-Hilaire, ‘Acclimatation et Domestication.’

† Baron Dumast. Extract from the ‘Bulletin de la Société d’Acclimatation du Nord-est,’ annexed to one of the petitions.

“Moreover, this miserable excuse of satisfied sensuality cannot even be invoked by these *chasseurs*, who, by way of showing their skill, will fire at a swallow, perhaps carrying food to her young brood. To these men, cruel from thoughtlessness, we may be allowed to observe that, by destroying 500 insects during the day, that swallow had rendered a greater service to humanity than if ten *chasseurs* had returned home with full bags.

“Is it not, also, from sheer ignorance that the peasant nails against his barn door the owl, the fern owl, and other birds by which his unhappy skill has deprived his fields and granaries of their natural protectors? Why does he not rather nail up his cat?

“And as if it was not enough that man should carry on this war of extermination, behold the very children in youthful carefulness—‘that age without pity,’ as La Fontaine styles it—devoted to bird-nesting. Eggs or birds, all the same to them. They break the first and torture the others to death.

“And the parents of these young monkeys, instead of whipping them and sending them back to school, placidly tolerate these acts of cruelty. Parents and children are probably ignorant of that noble passage of Scripture,—‘If a bird’s nest chance to be before thee in the way in any tree, or on the ground, whether they be young ones or eggs, and the dam sitting upon the young, or upon the eggs, thou shalt not take the dam with the young; but thou shalt in any wise let the dam go and take the young to thee; that it may be well with thee, and that thou mayest prolong thy days.’* ”

“In default of knowing Scripture they ought, at least, to know their own interests.

“The amount of mischief done in this respect is incalculable. Some children have brought home a hundred eggs in one day.* ”

“How have these defenceless species been able to survive this determined warfare? That is one of those mysteries which can only be explained by the wonderful goodness of God, who incessantly redeems the faults of his favourite creature, man.

* Deuteronomy, chap. xxii. verses 6 and 7. [*Note of Translator.*—The quotation in the French is not correct; it says, “Thou shalt not take either the dam or the young ones.” Deuteronomy justifies taking the young ones.]

† According to an approximate calculation, M. Gosselin estimates the number of birds’ eggs destroyed annually in France at 80,000,000 to 100,000,000. It is by thousands of milliards that must be counted the insects which the birds produced by those eggs would have destroyed. — *Note (manuscrite communiquée par M. G. Saint Hilaire).*

“ Let us look the matter in the face. The evil is great, and if we do not take care it will be beyond a remedy.

“ Some species have already abandoned us. The stork no longer builds his nests on our cottage roofs ; the smaller species are rapidly diminishing ; insects are increasing in proportion, to the great detriment of Agriculture. Prompt and energetic measures are required. What are those remedies ? Let us resume them in a few words.”

The Report then reviews the actual existing laws on “ La Chasse ” in France, and proposes a reform with a view to the protection of those birds which are of service to the agriculturist. The Report concludes as follows :—

“ It cannot be denied that the reforms proposed by the petitioners will clash with many prejudices, with many established customs in different parts of the country. Would it not be well to try persuasion before having recourse to coercion ?

“ The petitioners request that the Ministers of Agriculture and of Public Instruction shall concert together to give simple and clear instructions to schoolmasters, which would afford useful occupation in their classes. Already many ecclesiastics — among others the Cardinal Archbishop of Bordeaux—have taken the initiative in this moral as well as agricultural instruction ; there is every reason to hope that they will be seconded in this good work by our respected country curates.

“ From these various considerations, gentlemen, the Committee proposes that the four petitions in question be laid before the Minister of Agriculture, Commerce and Public Works.”

The Senate decided that the petitions should be presented as requested.

Destruction of Birds. — At page 7707 of the ‘ Zoologist ’ are some good observations on the scarcity and destruction of the feathered race ; and it gives one pleasure to read that the people of France are taking up the subject, and endeavouring to preserve native singing birds, as many of them destroy myriads of caterpillars and grubs, and are of essential use to the farmer. When travelling in France I have often been struck at the absence of the native singing birds. In some parts of Piccardy there are very few hedges, which may account for their paucity, at least as far as some sorts are concerned ; but in the woods the same absence is noticed, with the exception of the migrating genus. On one occasion, when travelling by diligence, in the month of May, we stopped *une petite heure* near Montreuil, and I listened with great pleasure to the sweet notes of at least twenty nightingales in full song, within a hundred yards of the inn where the diligence changed horses, at midnight. Notwithstanding this, I have been much astonished in the day time, in my walks near Dieppe,

a nicely wooded district, to observe the great want of small birds; I mean of those birds which are so common in Great Britain, and which according to all accounts were formerly numerous all over French territory. Throughout the whole of the North of France, too, the same want is apparent. The scarcity of birds extends to Belgium also. Probably the division of landed property into small tracts is one of the causes in both these countries. I trust that the law of primogeniture may be continued in England,} as her parks and magnificent country seats are the admiration of all foreigners who visit this land. Mr. Saville's observation on the scarcity of nightingales is, in my opinion, a little misplaced, as both that bird and the blackcap (named in Jersey and France the "fauvette") are very common abroad for a time, during their short song and short stay, in France as well as England. There are a few nightingales every May near my residence here, but as soon as they are heard by the birdcatchers they disappear in a week or two, and are seldom allowed to breed. About thirty-six years ago I planted nearly twenty acres of land near a former residence, and while the trees were young at least a dozen nightingales frequented these coverts, but as the young trees became large these birds deserted the coverts gradually, and at twenty-three years' growth the trees were visited and taken possession of by rooks, which built their nests there. The nightingale is fond of low underwood, hazel-nut bushes, and very young oaks; and when he sings in an old oak tree he seldom sits above twenty feet from the ground. These birds are, as Mr. Saville observes, becoming scarcer every year; but at the same time I hear of their appearing in localities lately where they have not been heard for many years. As to damage done by rooks and sparrows, there have been many letters upon the subject in that useful newspaper the 'Field.' Many of these letters are written by persons who evidently never lived long in the country, or, if they did, have not been acute observers. To say that rooks do no damage to fields of sown wheat, seed potatoes, &c., is quite ridiculous. When these birds come in large flocks and live near, they must be kept off. There is no one fonder of rooks than I am myself, but I have often been obliged to make examples of a few in the spring, when they took a fancy to my fresh-planted seed potatoes. I have had more than one rookery take possession of my elm trees, and they have been preserved by me and my tenants for these thirty-five years. The same may be said of sparrows. When they occur in flocks of several hundreds and sometimes thousands, in August and September, they do much mischief, although they destroy myriads of caterpillars during the summer. Farmers make a great outcry at the damage done to their corn by sparrows, and many of the same men allow these birds to have two or three broods of young, during April, May and June, in and near their farm-yards, without molestation, until the corn is ripe. The jay, the magpie and the carrion crow are more or less destructive to the eggs and young of game. The jay destroys the eggs of the wood pigeon, the pheasant and partridge, and numerous other birds; the carrion crow destroys the eggs and young of every species of game, poultry, very young ducks and chickens, and is a most destructive bird; the magpie is nearly as bad. The latter bird I have seen knock down a young blackbird on the wing, and commence its demolition in a second. The late severe winter has considerably lessened the number of thrushes, many having been shot by the numerous idlers who were out in troops, and many others killed by the intensity of the cold, the thermometer being nearly forty degrees below freezing point on two or three nights. I have observed five of the goldencrested wren since last winter. This lively, diminutive species, the smallest of our English birds, probably being unused to seek

shelter in barns or houses, fell a victim to the cold in their usual roosting places, the spruce fir and the other green trees with thick foliage. That beautiful songster, the thrush, is not nearly so destructive in a garden as many suppose: his food consists principally of worms, insects and caterpillars. The blackbird is the great and wary cormorant of the fruit garden, particularly as to strawberries and currants. The bullfinch is a great destroyer of the buds of fruit trees; but the best observers say the buds are destroyed for the sake of an insect contained in them. This bird is evidently decreasing in numbers. I have heard an old gamekeeper say that in a very hot season (1826) he observed some rooks destroying the eggs of a pheasant for the want of water; and they carry off scores of ripe apples and walnuts from the orchards. I will merely add, in conclusion, that as long as we have large landed properties, held by single proprietors, there is little fear of the extinction of our indigenous British birds; but should the law of primogeniture be abolished, as it is in France, the result would be the same as it is in the latter country and in the island of Jersey, where small native birds have been a great rarity for many years past.—*H. W. Newman; Hillside, Cheltenham, September 2, 1861.*

*Remarks on some of the Birds that Breed in the Gulf of
St. Lawrence.* By HENRY BRYANT, M.D.*

THE trip to Labrador, made by me the past summer, for the purpose of procuring specimens of the eggs of those sea birds that breed there, and also to ascertain what changes, if any, had taken place in their economy since Audubon's visit, was unfortunately delayed till the 21st of June; so that the results were much less satisfactory than I hoped to have obtained. Instead of visiting Anticosti and the whole of the north shore, I was compelled to sail directly to the Bird Rocks, thence to Romaine, the nearest point to the north shore, and from thence, following the shore line, to Chateau Beau at the outlet of the Straits of Belle Isle, the farthest point reached.

The season was remarkably stormy and cold, and I was informed by every one that such an inclement one had not been known for years. This also delayed my progress and added much to the difficulty of making researches, as many of the breeding places of this class of birds are accessible only in pleasant weather.

We sailed from Gaspé on the 21st, and arrived at the Bird Rocks on the morning of the 23rd; these are two in number, called the Great Bird or Gannet Rock, and the Little or North Bird; they are about three-quarters of a mile apart, the water between them very shoal, showing that, at no very distant epoch, they formed a single island. They are composed entirely of a soft, reddish brown sandstone, the

* From the 'Proceedings of the Boston Natural History Society,' vol. viii.

strata of which are very regular and nearly horizontal, dipping very slightly to the S.W. The North Bird is much the smaller, and though the base is more accessible, the summit cannot, I believe, be reached, at least I was unable to do so; it is the most irregular in its outline, presenting many enormous detached fragments, and is divided in one place into two separate islands at high water; the northerly one several times higher than broad, so as to present the appearance of a huge rocky pillar. Gannet Rock is a quarter of a mile in its longest diameter from S.W. to N.E. The highest point of the rock is at the northerly end, where, according to the chart, it is 140 feet high, and from which it gradually slopes to the southerly end, where it is from 80 to 100 feet.

The sides are nearly vertical, the summit in many places overhanging. There are two beaches at its base on the southerly and westerly sides, the most westerly one comparatively smooth and composed of rounded stones. The easterly one, on the contrary, is very rough and covered by irregular blocks, many of large size and still angular, showing that they have but recently fallen from the cliffs above. This beach is very difficult to land on, but the other presents no great difficulty in ordinary weather; the top of the rock cannot, however, be reached from either of them. The only spot from which at present the ascent can be made is the rocky point between the two beaches; this has, probably from the yielding nature of the rock, altered materially since Audubon's visit; at present it would be impossible to haul a boat up from want of space. The landing is very difficult at all times, as it is necessary to jump from a boat, thrown about by the surf, on to the inclined surface of the ledge, rendered slippery by the Fuci which cover it, and bounded towards the rock by a nearly vertical face. The landing once effected, the first part of the ascent is comparatively easy, being over large fragments and broad ledges, but the upper part is both difficult and dangerous, as in some places the face of the rock is vertical for eight or ten feet and the projecting ledges very narrow, and the rock itself so soft that it cannot be trusted to, and in addition rendered slippery by the constant trickling from above, and the excrements of the birds that cover it in every direction.

Since Audubon's time the fishery, which was carried on extensively in the neighbourhood of Bryon Island, has failed, or at least is less productive than on the north shore, and I am inclined to think that at present the birds are but little disturbed, and that consequently their number, particularly of the guillemots, has much increased.

There was no appearance of any recent visit on the top of the rock, and though after making the ascent it was obvious that others had preceded us, still the traces were so faint that it was several hours before we succeeded in finding the landing-place. The birds breeding there, at the time of our visit, were gannets, puffins, three species of guillemot, razorbilled auks, and kittiwakes. These birds are all mentioned by Audubon, with the exception of Brunnich's guillemot, and the bridled guillemot confounded by him with the common species. No other breeding-place on our shore is so remarkable at once for the number and variety of the species occupying it.

Of the seven species mentioned, I am not aware that three, namely, the kittiwake and the bridled and Brunnich's guillemot, are known to breed at any other place south of the Straits of Belle Isle; of the remaining four, two, the foolish guillemot and razorbilled auk, are found at many other places and in large numbers; the puffin in much greater abundance on the north shore, particularly at the Perroquet Islands, near Mingan and Bras D'Or; the gannet at only two other points in the Gulf, at Percé Rock near Gaspé, which is perhaps even more remarkable than Gannet Rock, but is at present inaccessible, and at Gannet Rock near Mingan, which will soon be deserted by those birds in consequence of the depredations of the fishermen.

The following list of birds is not intended to comprise all those observed by me; all the land birds are omitted, as well as those water birds to our present knowledge of which I could add nothing. Before leaving home I had flattered myself that I should have an opportunity of seeing some of the rarer rapacious birds, or the Iceland or Greenland falcon, duck hawk, &c. Strange as it may seem, during the whole of my visit to the north shore, I saw only a single bird of this class—a fine golden eagle at Bras D'Or. I mention this, not as proof that those birds are unknown, for I frequently found on the shores unmistakable evidence of their visits, but to show with how much caution the results of any individual's experience should be received as positive evidence in Natural History.

As Audubon has generally given the average dimension only of the eggs of the birds described by him, which affords but a very incorrect idea of the variation in size and shape, I have made careful measurement of the extremes in length, breadth and size of the eggs of all the varieties procured by me, not, however, including those which were evidently abnormal. In this class I found eggs of the common cormorant and herring gull; they were not more than one-quarter of the average size, without exception contained nothing but albumen, and

the shell was remarkably thick and strong. One egg of the cormorant was not symmetrical in its longitudinal axis, and had the appearance of having been deposited in a soft state on a convex surface; in other respects it presented nothing remarkable. I have been led to make these remarks because Naumann, in his description of the eggs of *Uria troile*, states that the eggs of very small size are found, caused by the birds laying more than their normal number. I do not think that this is the cause, as the eggs found by me were in nests with other eggs that presented no deviation from the ordinary shape or size.

Eider Duck (*Somateria mollissima*). This bird, though constantly harassed by the fishermen and inhabitants, still breeds in great abundance along the whole extent of the north shore, and, as it is not gregarious during the breeding season, and ranges over such an immense extent of island and shore, it will probably continue to do so, even if unprotected, for many years. I found but few of their nests, placed under the shelter of dwarf firs and junipers; their favourite breeding-places seemed to be the small grassy islands found in bays, and particularly those where small spots of turf were protected by a rock from the prevailing wind. On many of the islands a species of umbelliferous plant grows abundantly, the thick foliage of which forms an admirable shelter that they gladly avail themselves of. It is not often that many nests are found on one island; from one to a dozen is the ordinary number, though on Greenlet Island, in the Straits of Belle Isle, I found over sixty, probably not more than a quarter of the whole number, as two other persons besides myself were searching for them at the same time, and it is not probable that all the nests would be discovered; indeed, I found nearly as many returning as on first going over the ground. This island is, however, peculiarly adapted to their wants, being covered with a thick growth of the plant above mentioned, hardly elevated above the water, and at a sufficient distance from the main land to prevent it being often visited by the inhabitants. I found on this island a nest in a small stone hut, made for the purpose of concealing the hunters in the spring, at which time they shoot immense numbers of the eider or sea ducks, as they call them.

I found many nests in which the down was quite clean, and am inclined to believe that it is always so if the bird is undisturbed; but after having been frequently robbed, the supply not being sufficiently great, it is forced to eke it out with the most convenient substitute, and late in the season it is not at all uncommon to find nests without

any down. I found some containing fresh eggs, and others that had just been finished after the middle of July, and many birds had already hatched their brood by the 1st; it is probable that others had made at least three nests that season. Audubon states that the eggs are deposited on the grass, &c., of which the nest is principally composed. I did not see an instance, where there was any down, that this was the case. Nearly every day, during the first week or two, I found nests containing one, two, three or more freshly laid eggs, lying on a bed of down so exquisitely soft and warm that, in that almost painfully barren and frigid region, it was the ideal of comfort, almost of beauty. When the bird leaves her nest without being suddenly disturbed, I believe the eggs are generally covered with down, always so after the full complement has been laid. The largest number of eggs found by me in a nest was six, and this in so many instances that I am inclined to think it the normal number; in colour they present two varieties, one of a pale greenish olive or oil-green, and the other a brownish or true olive; the former are frequently marked with large spots or splashes of the same colour of much greater intensity; the latter are invariably unspotted. After the eggs have been incubated for some time, they are always more or less scratched and marked, probably by the claws of the bird while sitting on them or rolling them over. In shape they present little variety, being always nearly oval; the diameter is considerable. In size the difference is perhaps less than in the majority of birds.

Gannet (*Sula bassana*). The northerly or highest half of the summit of Gannet Rock, and all the ledges on its sides of sufficient width, the whole upper part of the pillar-like portion of the Little Bird, and the greater part of the remaining portion of this rock, were covered with the nests of the gannet at the time of my visit. On the ledges the nests were arranged in single lines nearly or quite touching one another; on the summit, at regular distances one from the other of about three feet. Those on the ledges were built entirely of sea-weed and other floating substances; on the summit of the rock they were raised on cones, formed of earth or small stones, about ten inches in height and eighteen in diameter when first constructed, presenting, at a short distance, the appearance of a well-hilled potato field. I saw no nests built of *Zostera*, or grass, or sods; the materials were almost entirely Fuci, though anything available was probably used; in one case the whole nest was composed of straw, and in another the greater part of Manilla rope-yarn.

The nests on the summit of the Great Bird were never scattered,

but ended abruptly in as regular a line as a military encampment. Through the midst of the nests were several open spaces, like lanes, made quite smooth by the continued trampling of the birds, which seemed to be used for play-grounds; these generally extended to the brink of the precipice, and reminded me very much of the sliding places of otters.

The birds were feeding principally on herring, but also on capelin filled with spawn, some fine-looking mackerel, a few squids, and in one instance a codfish weighing at least two pounds. The surface was swarming with a species of *Staphylinus* that subsisted on the fish dropped by the birds. Occasionally a nest could be seen in which the single egg had not been deposited, and perhaps one in two or three hundred with a newly laid one; on all the rest the gannets were already sitting, and though none of the eggs were as yet hatched, many of them contained fully formed chicks. On being approached the birds manifested but slight symptoms of fear, and could hardly be driven from their nests; occasionally one more bold would actually attack us. Their number on the summit could be very easily and accurately determined by measuring the surface occupied by them; by a rough computation I made it to be about fifty thousand pairs, and probably half as many more breed upon the remaining portion of the rock and on the Little Bird.

All the birds I saw were in adult plumage, differing in this respect from those breeding in the Bay of Fundy, where many were young birds. The egg of the American bird has not, I think, been described. Audubon was unable, on account of the weather, to ascend the rock, and I think his description was without doubt taken from a European specimen.

In shape and general appearance the egg is more like that of the brown pelican than of any other North American bird, and it is sometimes stained with blood, as that commonly is. The cretaceous or calcareous coating is thicker than it is on the egg of any other bird that I am acquainted with, and it is very generally marked with scratches and furrows, as if deposited in a soft state; in one specimen this coating is two millimetres in thickness, nearly one-twelfth of an inch; so that the egg, though emptied of its contents, feels nearly as heavy as an ordinary one that has not been blown. In shape there is a greater tendency to elongation or flattening of the ellipse than in the pelicans. The colour when first laid is a chalky white, which soon becomes a dirty drab.

Cormorant (*Phalacrocorax carbo*). On the 26th of June I had the

pleasure of visiting, for the first time, a breeding-place of this species. It was situated on the south side of the rocky wall that bounds the gulf at Wapitagan, and is probably much the same as it was twenty-seven years ago at the time of Audubon's visit; it extends for nearly half a mile along the face of the cliff, which is there from a hundred to a hundred and fifty feet in height, not perfectly vertical, but falling back slightly towards the land as it rises. Although not by any means easy of access, it is yet much less dangerous than Gannet Rock, as the smallest projection can be depended on, and the rough surface of the granite enables one to crawl over it without fear of slipping. As the eggs are not considered worth collecting, and it requires a good deal of time and patience to ascend the precipice, the birds had not, I think, been disturbed before my visit. The nests were built precisely as described by Audubon, and placed wherever there was any room for them. Some of them contained half-grown young, and others were but just finished, but by far the larger number either young or eggs that were nearly hatched. I did not see a single bird that had more than the merest trace of the long white feathers of the neck and thighs. The full number of eggs is four, and, excepting when first laid, they are filthy in the extreme. In shape they are more regular than in the Florida cormorants, but less so than in the doublecrested, the only species of this genus with whose eggs I am sufficiently acquainted to properly compare them. The calcareous coating of this egg, as also of that of the *P. dilophus*, is much softer than that of the *P. floridanus*, and can readily be rubbed off with the fingers; in some specimens it is quite thick, and is frequently deposited in irregular sheets, or even lumps. The birds were very tame, and, though they flew off on our approach, returned to their nests the moment we moved to another spot. On alighting on the sides of the precipice they cling to it with their tail and claws, much like swifts or woodpeckers, and before alighting almost always swooped down nearly to the surface of the water, and then rose in a curved line to the surface of the cliff, without moving their wings and almost with the regularity of a pendulum. Though these birds breed on many other points on the coast, I did not find them in as large numbers anywhere else. The number at Wapitagan was from 4000 to 5000.

Doublecrested Cormorant (*P. dilophus*). This species, so closely resembling the Florida cormorant, I found breeding only at one place, Wapitagan; it was not so abundant as the *P. carbo*, being in the proportion of about one of the present to four of the other. The northerly part of the breeding-place was occupied exclusively by the

present species, the central part by both, and the southerly by the common species only. Though so early in the season, there was hardly a trace of the nest remaining on any of the birds. Their nests were apparently as bulky as those of the common species, and as they are certainly occupied for more than one year, I am inclined to think it not uncommon for the nest built by one species to be occupied by the other the next season. As a general rule they preferred the lowest hedges, where the two species were breeding in common; but the highest nest of all was one of the present species. Where the ledge was long enough to admit of several nests, they were generally occupied by the same species; where there were only two or three, much more frequently by the two. In one or two places near the summit, where the rock was broken in such a way as to present a series of little niches, they seemed to alternate, as if by design. The two species were evidently on terms of perfect friendship, and when not sufficiently near to be distinguished by colour or size, no difference could be detected in their habits or motions. The nests contained the same variety of eggs and young as those of the preceding species; if anything, the number of newly laid eggs was proportionably less. The eggs, four in number, were of a more regular oval, but otherwise similar in appearance, and the difference in size by no means proportioned to that of the birds themselves. At the time of Audubon's visit none of the present species were seen at Wapitagan, and he says that he never found them breeding on precipices, but always on flat rocks. I was unable to visit the breeding-place mentioned by him, near Cumberland Harbour, though I passed near, both going and returning, and even remained two days at Tête de Baleine, in hopes that the sea might go down sufficiently to make it possible to land on the rock.

Leach's Petrel (*Thalassidroma Leachii*). These birds were frequently seen, but do not breed in numbers or in many places on the north shore. I found them but at two places—on Gull Island, at Romaine, and on a small island between Mecattina and Bras D'Or. As the opposite shore of Newfoundland is lower, and the islands less rocky, it probably breeds there. On the Atlantic shore it is found breeding everywhere that a suitable island exists, from Mount Desert, in Maine, to the Straits of Belle Isle. At Romaine the eggs were but just laid on the 26th of June.

Shearwater (*Puffinus* — ?). Shearwaters were very numerous in the Straits, and as at that time they must have been feeding their young, their breeding-places were probably at no very great distance.

Owing to the stormy weather I was unable to procure a specimen so as to identify the species, and did not succeed in finding their breeding-place. None of the inhabitants questioned by me had ever found the egg or knew anything about their breeding-place.

Arctic Skua (*Lestris arcticus*). Also very abundant in the Straits, but not found breeding.

Great Blackbacked Gull (*Larus marinus*). This beautiful and powerful gull we found breeding, on almost all the grassy islands north of Romaine, in greater abundance as we approached the Straits. I saw nothing in its habits not already well known. I am sure, however, that it has been represented as much more rapacious and tyrannical than it deserves to be. On Greenlet Island, which I have already mentioned as the abode of great numbers of eider ducks, I found twenty-two nests of this bird; among the number one not a foot from the nest of an eider, both containing eggs. I did not see a single egg-shell or any appearance of any eggs having been destroyed by the gulls. On all the islands where the herring gulls breed this species is found in greater or less numbers, apparently on as good terms with them as with its own species. I saw no peculiarity in its flight, and have often watched one for some time to ascertain what species it belonged to, before a good look of his black back betrayed it.

The nest is much oftener placed on the bare rock than that of the following species, and is not unfrequently found singly on some small rocky island, which the other never is. The eggs are three in number, and are generally easily distinguished from those of the herring gull by the colour as well as size. The spots are generally fewer in number and much larger, and this is almost a specific character.

Silvery Gull (*Larus argentatus*). This bird was not found by Audubon breeding anywhere on the coast of Labrador. I can hardly attempt to account for this. It is difficult to believe that a bird, now one of the most abundant on the coast, breeding on nearly all the grassy islands, and which the inhabitants state to have always been abundant, could have been overlooked by Audubon; still this is the most probable supposition, and he mentions, as a fact, something that would seem to favour this view, namely, that the blackbacked gulls change their plumage so as to resemble large herring gulls.* I visited

* "The most remarkable circumstance relative to these birds is that they either associate with another species, giving rise to a hybrid brood, or that when very old they lose the dark colour of the back, which is then of the same tint as that of the *Larus argentatus*, or even lighter."—Audubon, 'Birds of America,' 8vo, vol. vii. p. 178.

probably thirty breeding-places of this bird, between Romaine and Chateau Beau, at all of which there were blackbacked gulls in greater or less abundance, but in the whole of this distance I found but one spot on which the blackbacked gulls were breeding by themselves in a greater number than one, or, at most, two pairs.

As the islands on which these birds breed are all known by the inhabitants, and the eggs and young are both favourite articles of food, they are much harassed by them. At Flat Rock, for instance, where many of these birds breed, on the 26th of July there were from fifty to sixty young birds, the greater number of which, as well as all the eggs, were carried off, and many of the old birds shot by a party of eight whalers, who landed on the island at the same time with ourselves. Nothing remarkable was observed in their method of building their nests. The eggs are subject to a larger amount of variation in form and colour than those of most of the genus; the large spots found in the saddleback are seldom seen.

Razorbill (*Alca torda*). This species, though abundant, is probably less numerous than the foolish guillemot; it is, however, much more generally distributed, and breeds on almost all the rocky islands in greater or less numbers, even on those at some distance from the open waters of the Gulf, which the *Uria troile* I believe never does.

The eggs can generally be easily distinguished from those of the guillemots, though some of the latter are so similar that I think they cannot be determined with positive certainty. Naumann says that they can be distinguished by the spots being always shaded on their edges with reddish brown. This is not strictly true, and I have seen eggs of the guillemots in which the spots were similarly shaded. The number of eggs is stated by Audubon to be two; though I have seen hundreds of them, I never found more than one laid by the same bird, and in no instance anything like a nest. The greatest number found breeding at any one place was on an island called Tête de Baleine, near the Fox Islands. From the eggs being generally deposited in cracks and fissures, or under projecting masses of rock, they are more difficult to be obtained, and consequently the birds are not so much disturbed as the guillemots. In the ninth volume of the 'Pacific R. R. Survey' it is stated that the white line from the nostril to the eye is never absent in this bird in any state of plumage. Naumann says, on the contrary, that in the first plumage it is nearly impossible to distinguish it from the young *Uria arra*. I have a fine adult specimen in winter plumage, and also a young bird of the year, without a trace of the white line.

Black Guillemot (*Uria grylle*). - Breeding everywhere in abundance. One specimen had the posterior edges of the upper mandible and the lower edges of the rami of the under mandible deep red. I never found more than two eggs laid by the same bird. On July 3rd, on a small island where there was no appearance of the birds having been disturbed, the greater number had but just commenced incubating, and none of the eggs were hatched.

Common Guillemot (*U. troile*). The most common bird on the Labrador coast,—breeding at various points, from the southern extremity of Nova Scotia to the entrance to Hudson's Bay. From the number in which they assemble at their chosen breeding-places, the eggers and fishermen are enabled to collect their eggs with great ease: the extent to which these birds are persecuted may be imagined from the fact that, though on the 23rd of June young birds were common at Gannet Rock, where they are but little if at all disturbed, up to July 20th I saw but one young bird on the Labrador coast. At the Murre Rock, so famous at the time of Audubon's visit for the number of guillemots breeding there, on the 2nd of July not more than a hundred eggs could be collected, and apparently not over a thousand birds were breeding on it, probably not a hundredth part of their former numbers. On account of the violence of the sea I was unfortunately unable to visit the Foxes, as they are called, a short distance north of the Murre Rocks, and at present said to be their favourite breeding-place. Naumann, in his description of the eggs of this bird, states that he has never seen an unspotted specimen. I have several in my possession, and it would be strange if, in a bird whose eggs are so extremely varied in their coloration, they should not occasionally be found of a uniform colour.

Uria ringvia. As this bird was unfortunately confounded by Audubon with the preceding species, it is at present impossible to ascertain what were its limits or numbers at the time of his visit. There can be little doubt, however, that it was not at all rare on the Labrador shore. None were seen by me at any place, except Gannet Rock, though I think it must breed at other points on the coast. The eggs are said by Naumann to be larger than those of the foolish guillemot, and the shell to be smooth, and the spots to be seldom large, &c. The largest guillemot egg found by me was one of the present species, but in respect to the coloration I notice no particular mark by which they could be distinguished. When at Gannet Rock I unfortunately supposed that I should find this and the succeeding species equally common on the north shore, and neglected to procure

many specimens. The largest and handsomest egg procured is one of the green variety, and marked over the whole surface with lines that present very much the appearance of Chinese characters; it resembles, however, specimens of the eggs of *Uria troile*, and I see no character by which it could be distinguished from them.

Naumann gives as one of the distinguishing features of the eggs of this bird a peculiarly fine spotting or dotting, which gives the whole egg, at a short distance, the appearance of being uniformly dark-coloured. I saw no eggs at Gannet Rock that presented this peculiarity, but in the collection of the Smithsonian Institution there are eggs from California of another species, which are so marked. The species to which these eggs belong is as yet doubtful. Among the thousands of eggs of *U. troile* seen by me at Labrador not one presented this peculiarity.

Uria lomvia. Every available spot on the sides of Gannet Rock, not already occupied by the gannets or kittiwakes, had been taken possession of by the three last-mentioned species of guillemots and the razorbilled auks; their comparative numbers were about three of *U. troile* to two of *U. lomvia* and one of *U. ringvia*, and about one auk to fifty guillemots. I noticed nothing in the habits of these birds not already well known.

According to Naumann, the eggs of *U. lomvia* resemble a turkey's in form: though their shape is generally more ovate, I have not been able to find any character by which they can certainly be distinguished. I have eggs, particularly of *U. ringvia*, that present this peculiarity as strikingly as any of the present species.

Occurrence of uncommon Birds at Balta Sound during the present year.—To those who take an interest in the migration of birds the annexed list may probably be worthy of attention:—

Blackbird (*Turdus merula*). August 26: a female seen upon the shore at Balta Sound, after a steady N.W. breeze. Last winter I observed several of both sexes among the rocks upon Balta Island, and at the point of Swinee-Ness, in this island (Unst), where they remained until spring, apparently but little inconvenienced by the severity of the season. About the end of March they suddenly disappeared, the wind at that time blowing steadily from the S.W.

Ring Ouzel (*T. torquatus*). I saw one upon stony ground below the Muckle Heog, May 14; wind S.E.

Robin Redbreast (*Sylvia rubecula*). Two arrived, March 20; heavy southerly gale.

Blackcap (*S. atricapilla*). Male seen in an elder at Helligarth, August 12. The wind had been blowing from the N.W. during the four previous days.

Whitethroat (*S. cinerea*). Several seen at Buess and Halligarth, June 9; wind S.W. (New to Shetland).

Yellowhammer (*Emberiza citrinella*). May 26; wind S.W.

Crossbill (*Loxia curvirostra*). Two families visited the garden at Halligarth, June 30; wind N.W. since the 17th. From among them I shot one equal in size to an adult male, and in the green and gray plumage of a first year's bird, but having both greater and lesser wing-coverts dull white.

Jay (*Corvus glandarius*). August 26; wind N.W.

Spotted Woodpecker (*Picus major*). September 3: I shot two in the garden at Halligarth, the wind having been blowing steadily from the S.E. since the 1st. One is a full-grown male, the other a young male of the year. This species sometimes occurs in Orkney, but has not hitherto been recorded as a visitor to Shetland.

Hoopoe (*Upupa epops*). On the 15th of August, during a strong E. wind, I saw one upon the side of a hill, within a few hundred yards of the spot where, on the 21st of August last year, I shot the individual of the same species which so puzzled some of my friends as it suddenly appeared before them in the dusk (Zool. 7341). On the 27th of September following I observed another near the head of Balta Sound, flying, or rather fluttering, apparently with some difficulty, in the very face of a stiff breeze from N.E.

Martin (*Hirundo urbica*). May 31; wind S E. Balta Sound and a hill above the Loch of Cliff. Others were seen about the same time in various parts of the island.

Swift (*Cypselus apus*). July 18; wind S.W. Haroldswick and Balta Sound.

Nightjar (*Caprimulgus europæus*). July 28; wind light and variable. Halligarth.

I observe that in my 'Notes on the Birds of Belgium' two trifling misprints have occurred. P. 7541, line 14 from bottom, for "seed-beds" read "reed-beds;" p. 7628, line 20 from top, for "Quartres" read "Quatier."—*Henry L. Saxby; Balta Sound, Shetland, September 4, 1861.*

White Variety of the Song Thrush and Bullfinch.—The first nest contained four birds, one white and three of the usual brown colour. This white bird was taken when only partly fledged, the first week in April. The second nest contained only three birds, all white, and these were hatched May 24th. The third nest contained four birds, hatched just five weeks after, one of them white, two brown, and one brown with some of the tail and wing feathers marked with white. Of the white birds two were affected in an extraordinary manner during a severe thunderstorm we had here a short time ago. One in particular, whenever there was a probability of a change of weather and the atmosphere was lowering, would sit down and gasp in a convulsive manner; and it seemed to get worse with age. Although it ate well, it wasted away to a skeleton, and I had to have it killed. The other is not injured to so great a degree. It was affected in the head, and its under eyelid is contracted a little. When this storm happened the birds were in a cottage, and several bullfinches, nightingales and canaries were killed. Mr. Fletcher, of Albrighton, near Wolverhampton, informs me that he exhibited at the Crystal Palace, in 1858, a white thrush with pink eyes and yellow legs: my birds have red legs, and the eyes are of a dark cornelian colour. A few days ago a white bullfinch was shot in this neighbourhood.—*John Marshall; Belmont, Taunton, September 18, 1861.*

Notice of the Discovery and Capture, for the first time in the British Isles, of the Marsh Warbler (Calamoherpe pulstris).
By S. P. SAVILLE, Esq.

I HAVE great pleasure in recording the occurrence, for the first time in Britain, of the marsh warbler of Dr. Bree and other European authors. The specimen which I shall hereafter notice was shot in Wicken Fen, distant from Cambridge some twelve miles, on the 18th of June, 1859.

It was not until recently, while perusing the work just published by Dr. Bree, that I recognized a warbler in my possession, which I had for some time considered a new species, as identical with his figure marked "marsh warbler." After carefully and minutely going over Dr. Bree's description of that species, and comparing my bird with the plate in his work, I felt so convinced of their identity that I determined at once to communicate with Mr. Gould, at the same time forwarding my specimen, and desiring his able opinion. I have since received a prompt and courteous reply, stating that my surmises were correct, and that the bird agreed with a specimen in his collection labelled "Calamoherpe pulstris," from Austria.

I am aware that the identity of several of the European Sylvidæ is a much-vexed question, but not in this instance; and after the decision of so able and experienced an ornithologist as Mr. Gould no one will for an instant doubt the identity of my bird.

My attention was first attracted to this species some time since, during a visit to our fens, by the marked difference in the song of a bird somewhat similar in appearance to the true *C. arundinacea*; it was louder, clearer and sweeter toned than that of the last-named. Its mode of flight, too, was different both from that and *C. Phragmitis*, being more undulated and quicker. It was more shy and timid, continually retreating to the thickest covert; in short, it was of the most retiring and solitary habits. Never, as far as my experience goes, does it emit notes similar to the syllables "chee-chee-chee," so common to *C. arundinacea*. I have never observed it in any numbers, but on the contrary the instances have been few and far between; nevertheless I am of opinion that it is not so rare as might be surmised, and that after the publication of this notice, and an active research is made at Wicken and other adjacent fenny tracts, the species will be found to be an annual summer visitant. Perhaps it has hitherto been confounded with its congener, *C. arundinacea*. This, coupled with its solitary habits, may have caused it to pass unobserved by many an

experienced ornithologist. It is some years since I first discovered this warbler as a resident in our fens, more particularly that of Wicken. This may possibly be attributed to the fact of my having visited that part more frequently than any of the others. I see no objection to the theory that many yet undiscovered species are regular visitants to our fens, affording as they do so suitable an abode. Should this discovery stimulate research, or in any way forward this lovely study, it will be no slight satisfaction to myself.

I now proceed to point out its specific characters:—Upper parts of the plumage gray shaded with greenish gray; a distinct streak of a yellowish white passes over each eye, and the under parts of the body are also white with an ochreous tinge; tail-coverts yellowish, edged with olive-gray; both the outer tail-quills pale whitish at the end; the longest wing primary longer than the longest secondary. Length $5\frac{1}{2}$ inches and 2 lines; carpus to tip, $2\frac{1}{4}$ inches and 4 lines; tail $2\frac{1}{4}$ inches; tarsus 9-tenths of an inch; claws long and slender; the wings of my example are longer than those of *C. arundinacea*; beak above light horn-colour; lower mandible lightish yellow.

Dr. Bree gives the following as its geographical range:—Russia, Germany, Holland, Belgium, Switzerland, Italy and France. Count Mühle informs us that this species is found in the whole of North and South Africa, and in the south-west of Asia.

Brehm, in Bäderer's work upon European eggs, says of this bird:—
 “It builds in bushes, in meadows and on the banks of ditches, rivers, ponds and lakes. The nest is made of dry grass and straw, with panicles, and interwoven with strips of inner bark and horsehair outside. The rim is only very slightly drawn in. It has a loose substructure, and is by this and its half-globular form suspended on dry ground between the branches of the bushes or nettles. Easily distinguished from the strongly-formed nest of *C. arundinacea*, which is moreover built over water. It lays five or six eggs at the beginning of June, which have a bluish white ground, with pale violet and clear brown spots in the texture of the shell, and delicate dark brown spots on the surface, mingled with which are a number of black dots. The ground colour also, in many fresh eggs, is green, but clear and very different from the muddy tint of the eggs of the reed warbler. The female sits daily for some hours, but the male takes his turn. Incubation lasts thirteen days.”

S. P. SAVILLE.

Dover House, Cambridge,
 September 14, 1861.

Cliff Swallow of Canada.—The republican or cliff swallow, which is but a recent addition to the fauna of this part of the continent, in its original character, builds its nest in caves, and under the overhanging ledges of perpendicular rocks; when lured to this district, probably by the abundance of their favourite insect food, which is found along our marshy lands, and not finding rocks suitable for their purpose in the breeding season, they frequently choose, as a substitute, the end of a barn or other outhouse. I have seen such a republic in the country, where the upper part of the end of a barn was literally covered with clay, and perforated with numerous circular holes, out of which the full dark eyes and gaping bills of the callow inmates were frequently seen protruding; there must have been from two to three tons of clay used in the work, and the constant visits of the parent birds at this interesting season gave the building at a short distance much the appearance of a great bee-hive.—*Thomas M'Ilwraith, in 'Canadian Naturalist.'*

Cuckoo's Egg in a Reed Warbler's Nest.—As I can find no mention in either Yarrell or Cuvier of cuckoos depositing their eggs in the nests of reed warblers, I imagine it may be of rare occurrence. While on the Thames, about a mile above Streetley, with a friend, on the evening of July 12th, we noticed a reed warbler fly into some reeds. Thinking there might be a nest there, we marked it down and rode in. We found the nest close to where the bird settled, about a yard from the bank, but to our surprise saw a large brown bird on it. It remained while we cut the nest out, and pecked tremendously at our fingers when we got it into the boat. I soon saw it was a young cuckoo, and I should think was about a week or ten days old. There were a few feathers wanting on its breast, but it seemed that if it had remained two or three days longer it would have outgrown the nest, which was built on four reeds, and was unusually dirty and untidy for a reed warbler. I sent the bird to be stuffed, so all doubt as to its being a young cuckoo is done away with. On mentioning the circumstance to another friend he told me that he also had found a cuckoo's egg in a reed warbler's nest, near Colchester, in Essex, about four years ago. This fact goes a long way to prove that cuckoos, after depositing their eggs on the ground, take them up in their beaks, and thus place them in the nests of other birds, as it is obviously all but impossible for a cuckoo to remain on a reed warbler's nest while laying its egg in it.—*R. Ramsden; Brighton College, August 19, 1861.*

Hatching Young Ostriches.—Since the French occupation of Algeria ostriches have been conveyed thence to France in great numbers, and attempts have been frequently made to breed them in the Zoological Gardens of Marseilles, but as frequently failed. Even last year, notwithstanding the care devoted to the ostriches in that establishment, and though eggs were laid in plenty, no young ostriches could be hatched. The director, M. Suquet, however, was not to be foiled. Failing to accomplish what he desired in the gardens, he bethought himself of trying what could be done out of them. In the territory of Montredon he selected a sandy plain, situated between the sea and the mountains, which form the south-east of the Gulf of Marseilles. The spot belongs to M. Pastre, who kindly gave the necessary co-operation. There a large secluded valley was fixed upon, sufficiently wooded to afford shelter, without intercepting the sunshine necessary for quickening the eggs. After having enclosed a space 600 metres long by 500 wide, the birds were conveyed to their hatching-ground on March 2, of this year. For a few days the birds seemed to regard their new quarters with suspicion, and ran anxiously about. Soon, however, they settled themselves and began laying. Their nest was at first a simple excavation

in the sand, in the form of a truncated cone. Gradually the borders of this hole were heightened by accumulations of more sand. At this labour the male and female bird worked alternately. A few hours after the completion of the nest laying began, and was continued every alternate day, until, by the 20th of April, fifteen eggs had been deposited. Up to this time the hen guarded the nest a few hours before and after incubation, sometimes for a whole day. After April 20, however, the male bird commenced taking his spell of watching, the lady only seeing to the household during periods when her lord and master was temporarily absent from home. All seemed to go on satisfactorily. According to observations made by M. Hardy, at Algiers, the time of incubation should be from fifty to sixty days. Knowing this, M. Suquet was surprised when, on June 3, intelligence came that the first young ostrich had opened its eyes to sunshine on French soil. By the evening eleven had been hatched. On the day following the young birds left the nest, and began to wander over their enclosure, guided alternately by papa and mama, who spared no trouble in this their first walking lesson. During these excursions one bird always lingered a little behind. It was weak and soon died, thus reducing the number of the family to ten. They went on growing rapidly, so that, by the 8th of this month (August) they were as big as young turkeys, giving every promise of arriving in due time at years of discretion, and contributing for many a season to the *grande tenue* of many a fair Parisienne.—*'Field' Newspaper.*

Luminous Feathers on the Breast of the Canadian Blue Heron.—On the breast of the great blue heron, covered by the long plumage of the neck, is a tuft of soft tumid feathers, which, when exposed in the dark, emit a pale phosphorescent light. The use of this does not yet appear to be fully understood, though the fishermen 'aver that when the heron retires at night to his feeding-ground he wades knee-deep in the water, and showing this light attracts the fish within his reach, much in the same way as the Indian does when fixing the torch of pitch-pine on the bow of his canoe.—*Thomas M'Ilwraith, in 'Canadian Naturalist.'*

Note on the Arctic Skua (Lestris parasiticus).—There appears to be some obscurity about the species of this genus. Some years since I corresponded with Mr. Yarrell in reference to a small species of *Lestris* which I obtained in the state of plumage generally recognized as the adult, *viz.*, with the under parts nearly white, with patches of pale yellow on the breast. It was a much smaller bird than the common Richardson's *Lestris*, and with the important character of having the two middle tail-feathers elongated to the extent of six inches, which I believe is never the case with *L. Richardsonii*, the elongation in that species being only two or two and a half inches. Mr. Yarrell, however, would not yield his opinion as to my bird being *L. Richardsonii*, because, as he said, the two long tail-feathers *graduated* and tapered from their bases to their points,—a character, he added, never observed in the smaller species, those feathers always appearing to be of the same uniform width from the base to the point. I mention this merely as suggestive of there being another and smaller species illustrative of Mr. Yarrell's doctrine, and which may be the true Arctic jaguer. What I am more particularly coming to at present is that there appears to be a great probability that this light-coloured character of plumage is the summer plumage of the adult birds. I have examined a specimen to-day in Mr. Vingoe's possession, which was sent in from the Land's End, exactly resembling my small bird referred to in size, and with the under parts nearly white; but the bird is in active moult, and all the new feathers in the breast, which are partly on the surface of the plumage and others

springing up under, are all of a wood-brown. The two middle tail-feathers are moulted off; the upper feathers of the plumage are appearing with pale edges, in substitution for a darker and uniform tone of colour. These birds (the skuas) withdraw to the Arctic regions before this period, but this specimen appears, from injuries received, one foot being cut off, to have been prevented from retiring with the rest; and hence the opportunity of observing it in moult. Further observations upon the points referred to in the characters of this genus will probably be made, and additional light thrown upon changes of plumage not hitherto attributed to the different species. — *Edward Hearle Rodd; Penzance, September 17, 1861.*

Occurrence of the Parrot Crossbill at Epping.—Three specimens of the parrot crossbill (*Loxia pityopsittacus*) were killed yesterday, at one shot, by a boy at Lambourne, about four miles from Epping,—a male in fine red plumage, another male in yellow plumage, and a female. This is the first occurrence of this species in this neighbourhood, so far as I am aware. The common and white-winged crossbill I have shot here.—*Henry Doubleday; Epping, September 21, 1861.*

Note on the Hawk's-bill Turtle (*Testudo imbricata*).—The occurrence of the hawk's-bill turtle in Scotland, mentioned in Mr. Edward's communication (Zool. 7713), is interesting, as an additional instance to those before recorded, and alluded to in my work on British Reptilia. At page 9 of that work Mr. Edward will find the following passage:—"The history of this species as a British visitant is confined to the mere notice of its accidental occurrence, on three different occasions, on the shores of Great Britain. Sibbald states that he received the shell of one which 'came into Orkney;' Dr. Fleming says, 'I have credible testimony of its having been taken at Papa Stour, one of the West Zetland islands;' and the late Dr. Turton has mentioned an instance of one which 'in the year 1774 was taken in the Severn, and placed in the fish pond of the author's father, where it lived till winter.'" The beautiful structure mentioned by Mr. Edward, as lining the œsophagus, has long been known. I take the liberty of offering the following passage from the work already quoted:—"The food of the turtle consists of marine plants, especially the sea wrack (*Zostera marina*); and they graze at the bottom of the water, coming at intervals to the surface to breathe. As this mode of taking their food renders them very liable to swallow with their aliment a considerable quantity of sea water, there is a beautiful structure lining the interior of the œsophagus, by which this circumstance is effectually obviated. This consists of a great number of horny pyramidal bodies, with which the whole exterior of the œsophagus is furnished, all of them directed backwards towards the stomach; by which means, although the food and the water together can be readily swallowed, yet when the stomach is contracted for the purpose of regurgitating the water, the food itself is retained."—*Thomas Bell; New Broad Street, August 31, 1861.*

Description of the Larva of Pamphila Actæon.—The larva feeds, in June, on *Calamagrostis epigejos*, chiefly under the shade of fir trees; it makes deep notches in the edges of the leaves, which help to betray its proximity. It feeds in the evening and at night, resting in the day time extended on the flat surface of a leaf. It is of

the form usual in the genus *Pamphilus*, and it has also the two snowy spots beneath, as in the larvæ of *P. lineola* and *P. sylvanus*. It is pale green, with a darker dorsal line, edged with a yellowish line on each side, and enclosing a paler central line. Along the side is a narrow yellow line above, and a broad one beneath; the two yellow lines on the back are prolonged as far as the middle of the green head, and run to the end of the rounded anal shield, which is narrowly edged with yellow. Towards the end of June the larva spins together two leaves with a few white silk threads, and becomes a slender, agile pupa, the peculiarities of which, however, I had no opportunity of observing. In a fortnight two males made their appearance at Vienna, I having taken the remaining pupæ with me on my journey.—*Professor Zeller, in 'Intelligencer.'*

Occurrence of Sphinx Convolvuli near Hull.—Until last evening I never saw *Sphinx Convolvuli* on the wing. Being in the garden shortly before seven o'clock I saw a large hawk-moth hovering over the verbena beds. It was too dark at the time to allow me to see whether it was a death's-head or a *Convolvulus* hawk-moth. By approaching very cautiously I succeeded in getting the moth under my hat, and on securing the same found it to be a specimen of the latter. As the specimen was somewhat worn, and my cabinet containing better ones, I let it fly again. Almost every autumn we hear of this moth being taken, sometimes in great abundance, but it seems a remarkable fact that the larva has hitherto escaped detection.—*G. Norman; Beverley Road, Hull, September 18, 1861.*

Occurrence of Sphinx Convolvuli in Yorkshire.—A fine male specimen of the above was captured, on Wednesday last, at Hipperholme, near Halifax, and is now in the possession of Mr. John Ingham: to all appearance it had only just emerged from the pupa. It measures $4\frac{1}{2}$ inches across the wings, and is in beautiful condition.—*G. H. Parke; Halifax, Yorkshire, September 16, 1861.*

Zygæna Minos in Scotland.—I was at Oban, in July, 1860, and there took in the course of two days more than a dozen specimens of the species then called *Zygæna Minos*: they were flying together with *Zygæna Filipendulæ*, *Z. Loniceræ*, *Procris Statices* (?), *Euthemonia Russula*, *Chelonia Plantaginis*, *Setina irrorella*, &c., on a heathy hill south-west of Oban: the *Procris* was also common on the grassy island in the bay. This *Procris* was in size and appearance more like *P. Globulariæ*, but the antennæ have blunt tips. Of the *Zygæna* I have now but five specimens in my cabinet, the rest having been distributed among friends, several of whom, better entomologists than myself, have yet accepted it as *Z. Minos*. I will proceed to describe it:—The wings are all semitransparent, the ground-colour being of a glossy greenish gray, quite distinct from the heavy metallic-green of *Z. Filipendulæ*; the body is hairy and blackish, but with a decided tint of green; the red blotches are just as described by Mr. Newman (*Zool.* 7677). In two of my specimens the costal and discal blotches distinctly overlap, and in two they do not, though all were taken at the same time and place. I trust that this fact will suffice to establish the existence of the species (whether its name be *Z. Minos* or *Z. Nubigena*) in the west of Scotland.—*Percy Andrews; 17, Montpelier Villas, Brighton, September 5, 1861.*

Description of the Larva of Ephyra orbicularia.—Like several other species of this genus, the larva rests in a peculiar twisted manner; when disturbed it immediately drops and suspends itself by a thread. Head reddish brown. Back olive-green, gradually shading off towards the sides to a delicate pink or salmon colour. A series of oblique lateral stripes of a dark brown, generally six in number, becoming indistinct

towards the anal extremity; the anal extremity itself purplish, bordered with salmon-colour. The body and legs are minutely punctured with olive-green spots. Length one inch and about two-eighths. It is an exceedingly delicate and pretty larva. The perfect insect is double-brooded; the first brood appears at the end of May. The larvæ feed up in about three weeks. Of forty pupæ the whole emerged within eight days. The eggs of this brood hatch about the middle of July, and feed slowly till the middle of September, when, like the other species of this genus, they attach themselves by a thread to the leaf or stalk, and pass the winter in the pupa state: It is an exceedingly easy insect to rear.—*J. Greene; Cubley Rectory, Doveridge, Derby.*

Description of the Larva of Cabera pusaria.—Rests in a nearly straight posture, with the head protracted on the same plane as the body. Head flattened, quite as broad as, and in young specimens rather broader than, the body: body uniformly cylindrical, without humps. Colour infinitely varied: 1st variety uniformly brown, with a pair of white dots on the back of each segment: 2nd variety green, with a median dorsal series of ill-defined brown spots, each spot situated at a junction of two segments, and the anterior ones having a small white spot on each side; each segment has also four black dots on its dorsal surface. Feeds on *Quercus Robur* (oak), *Betula alba* (birch), *Corylus avellana* (hazel), and many other trees: it is full fed in September, when it spins a loose cocoon on the surface of the earth: in confinement, when about to change, it is very partial to hiding under a leaf on the surface of the earth, and attaching its cocoon to the under surface of the leaf. The moth emerges in June, and continues to make its appearance throughout July and August: normally it has three equidistant transverse bars, but in a skilfully arranged series two of these may be seen gradually approaching until they become fused into one.—*Edward Newman.*

Capture of Emmelesia unifasciata near Forest Hill.—On a paling under an oak tree near here I have lately had the good fortune to take two fine specimens of this pretty species. When sitting on a fence the resemblance they bear to small, sharply-marked examples of *Coremia ferrugaria* is very striking, and might easily deceive beginners. This is also remarked by M. Guenée.—*R. M'Lachlan, in the 'Intelligencer'; Forest Hill, August 19, 1861.*

Description of the Larva of Speranza conspicuaria.—Rests in a straight, or, if disturbed, in a looped position. Head of rather greater diameter than the body, protracted, divided but not notched on the crown; body uniformly cylindrical, without warts or humps. Head slightly shining, pale brown, with black markings emitting about thirty short, slender but rigid hairs: body greenish smoke-colour, striped longitudinally, and emitting short scattered hairs: a narrow median stripe of the back blackish smoke-coloured; on each side of this a pair of very narrow, wavy, approximate, smoke-coloured stripes, on a greenish ground; then on each side of the body a broad blackish stripe; then a very distinct and conspicuous yellowish stripe, which encloses the spiracles: the belly has a median pale stripe, and the space between this and the bright lateral stripe is greenish smoke-coloured, traversed by very slender wavy paler stripes. I am indebted to Mr. D. T. Button for these larvæ, who reared them from eggs laid on the 4th of August, and which were hatched on the 14th of August; thus ten days were passed in the egg state and fourteen in the larva state: they fed on *Cytisus scoparius* (common broom), and were full fed on the 28th of August, when they spun a slight cocoon among the twigs of broom.—*Edward Newman.*

Description of the Larva of Emmelesia albulata.—Head rounded, narrower than the body; body rather stout, transversely wrinkled, having a corneous shining plate on the back of the 2nd and 13th segments. Head intensely black and shining; body dingy white, tinged with green, and having a broad median dorsal stripe and a narrower lateral stripe darker green; each segment has six, eight or ten minute black dots; the plates on the 2nd and 13th segments are smoke-coloured, and there is a similarly coloured corneous plate on the outer side of each of the posterior claspers: legs and claspers nearly concolorous with the body, but rather more dusky. It spins together the sepals of *Rhinanthus Crista-galli* (yellow rattle), feeding on the seeds, and is full fed about the middle of August, when it changes to a pupa within the domicile it has already formed: the moth does not appear until the following June. I am indebted to the Rev. Hugh A. Stowell for a supply of this larva, the interesting economy of which appears to have been known to Freyer.—*Edward Newman.*

Description of the Larva of Eupithecia pusillata.—Long, slender, and tapering considerably towards the head. Ground colour orange-red or dull ochreous-green. Central dorsal line dusky olive, often only apparent on the anterior segments. Subdorsal lines same colour. Spiracular line yellow. Segmental divisions orange. Central ventral line yellowish. The above description was taken from larvæ reared from eggs kindly sent me by Mr. M'Lachlan. They fed on spruce fir, and were full fed the first week in July. Pupa enclosed in a slight earthen cocoon. Slender and delicate. Pale ochreous-yellow. Eyes black and prominent. Upper edge of wing-cases bordered with two black spots, lower edge by a slender blackish line.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Tring, August 8.*

Description of the Larva of Eupithecia distinctata.—Rather long and slender, tapering considerably towards the head. Ground colour dark green. Central dorsal line broad, purplish red. Spiracular line indistinct, greenish yellow. Skin wrinkled. Back studded with numerous very short, stiff, bristly hairs. Down the centre of the belly a whitish line. Ventral segmental divisions yellowish. I have taken this larva in Derbyshire and Bucks, feeding on flowers of *Thymus Serpyllum*, in August. Pupa yellowish green and olive, enclosed in a slight earthen cocoon.—*Id.*

Doublebroodedness of Eupithecia assimidata.—At the beginning of July I took here two full-fed larvæ of *Eupithecia assimidata* on black currant. They spun up immediately, and in about a fortnight both the perfect insects appeared.—*Id.; August 13.*

Occurrence of the Larva of Eupithecia trisignata and E. tripunctata in Buckinghamshire.—I have lately been taking the larvæ of both the above-named species on flowers and seeds of *Angelica sylvestris* growing in the beech woods in this neighbourhood.—*Id.*

Description of the Larva of Anticlea sinuaria.—Head slightly divided on the crown, as broad as the body: body uniformly cylindrical, without humps or warts. Head yellowish green, with mottled black markings: body yellowish or bright green, with two black dorsal stripes scarcely so broad as the green median space between them: spiracles black: legs and claspers pale green: all parts of the body emitting fine short scattered black hairs. Feeds on *Galium verum* (lady's bedstraw), and is full fed by the end of August. Spins a slight web among the leaves or flowers, and changes to a short obese pupa, the wing-cases of which are very ample, and of a dark brown colour; the abdomen reddish. I am indebted to Mr. Brown, of Cambridge, for this larva.—*Edward Newman.*

Description of the Larva of Anticlea berberaria.—Extremely sluggish and

disinclined to move : when compelled to do so, it generally drops from its food-plant suspended by a thread. Rests with its claspers firmly attached, but most commonly has the legs free, the body being bent double, and the legs brought almost or quite into contact with the ventral claspers ; sometimes both the anterior and posterior segments are straight, the intervening segments constituting a loop. Head partially concealed by the skin of the 2nd segment, rounded on the crown, of somewhat less diameter than the body, slightly hairy : body obese, short and rugose, the rugosity occasioned by each segment having an elevated transverse skinfold, on which are situated several warts, each wart emitting a slender bristle. The colour is various : the prevailing varieties are—1st, a pale raw-sienna brown, with three dorsal stripes of a somewhat darker colour, all of them indistinct and the median one very slender : 2ndly, a brighter or burnt-sienna brown, with two broad, dorsal, longitudinal umber-brown stripes, and the faintest possible indication of a slender median stripe : 3rdly, a gray or putty-coloured ground colour, thickly sprinkled with black, and having on each side of each segment an indication of a large crescentic white mark ; in the last variety the base of the legs is black, and in all the varieties the head is beautifully tessellated, the tessellations in the brown specimens being a darker shade of the same colour, those in the gray specimens being pure black. Feeds on *Berberis vulgaris* (barberry). For this species I am indebted to Mr. Brown, of Cambridge, who informs me it is double-brooded, appearing in May and August : the larvæ from the second brood are those from which I have taken my description ; they were full fed at the end of September. Cancel description at p. 7361.—*Edward Newman.*

Description of the Larva of Cidaria russata.—Tucks in its head and curls up its anterior extremity into a tight volute when annoyed or disturbed. Long, cylindrical, the skin loose and much transversely wrinkled, having a few scattered hairs ; the 13th segment has two pointed processes originating below the anal aperture and directed backwards. Head, which is not conspicuously notched and of the same diameter as the body, pale opaque green : body pale yellow-green, without spots or stripes : the pointed anal processes are tipped with rose-colour. Feeds on *Cratægus Oxyacantha* (whitethorn), in the leaves of which it spins a very slight web, like a few spider's threads, and therein, about the first of August, changes to a delicately green pupa, with an acutely-pointed reddish tail. The pupæ, like the larvæ, have a few short scattered hairs, especially about the anal extremity. I am indebted to Mr. Thomas Hockett for both larvæ and pupæ. It is difficult to give a time for the appearance in the moth state of this common insect. I have found it more plentiful and in finer condition in September than in any other month, but there is scarcely a week during the summer months in which it does not occasionally occur.—*Id.*

Description of the Larva of Cidaria silaceata.—Rests generally in a straight position, except that the feet are occasionally attached to the stem of the food-plant, and then the anterior part of the body—that is, the head, together with the 2nd, 3rd and 4th segments—bent at a right angle with the remainder of the body, the 3rd pair of legs forming the apex of the angle ; when disturbed the legs are detached from the food, and the body bends and oscillates backwards and forwards as long as the disturbance continues. Head flattened, porrected, of equal diameter with the body : body long, slender, uniformly cylindrical, without tubercles, having distributed very sparingly over its surface short scattered hairs, very slender and inconspicuous except under a lens. Head pale whitish green, the face variously marked with clear brown, which colour is sometimes confined to the sides, sometimes pervades nearly the whole

face: body delicately green, with a median series of brown dots, one of which is seated on the skinfold between the segments; belly with a median and narrow but conspicuous white stripe: 1st and 2nd pair of legs whitish green delicately tinged with brown; 3rd pair brown, the colour continued on the belly to a length about equal to that of the legs themselves; ventral claspers pale green, with an exterior tinge of brown; anal claspers with a double lateral oblique stripe pointing towards the back; the anterior half of this stripe is white, the posterior half purple-brown. I found this larva in a garden at Leominster, feeding on *Circæa lutetiana* (enchanter's nightshade), and Mr. Thomas Hockett has obligingly supplied me with others reared from eggs laid on the 17th of August last, and hatched on the 25th of the same month: all the larvæ were full fed on the 20th of September, when they spun a small cocoon, of very loose structure and somewhat resembling net-work, against the side of the gallipot, and to this they attached a portion of the food-plant, and in this receptacle changed into pupæ.—*Edward Newman.*

Note on Dicranura vinula.—On young poplars I took the larvæ of *Dicranura vinula*, never more than three on a plant: the egg-shells remained to show how careful the parent had been to proportion the number of eggs to the supply of food for her young offspring. Four specimens of the moth came out about July 20th.—*E. Horton; Wick, Worcester, August 21, 1861.*

Description of the Larva of Clostera reclusa.—The larva of *Clostera reclusa*, when full fed, is smoky; a broad drab dorsal band with smoky and dull orange marks; a large raised jet-black spot on the 5th and 12th segments; spiracular band broad, orange, with drab markings; spiracles black; head smoky. Its habits are peculiar, and fully justify its name—the recluse. When very young it feeds between united leaves, like a *Tortrix*; when older, and about to change its skin, it makes a leaf into a box, or joins together two leaves very closely, as if for the purpose of changing to pupa, and so retires from the world. After changing its skin it eats the inside of its box, and then comes out and goes to another leaf. I am not sure if it does not make these resting-places at other times; but in the majority of those I opened I found the larvæ either nearly at the point of changing skin, or fresh-coloured and with large heads, as if the change had lately taken place. When full grown they may sometimes be seen feeding out of their cages, eating the leaf edgewise; very rarely, however, except in confinement. When about to assume the pupa state they make their last box (or coffin, I suppose I should now call it), similar to the others, between leaves, not on the ground. In confinement they seemed to prefer using the muslin with which their cage was covered for that purpose, drawing the loose folds together, and lining the inside with silk. The place where I found them in considerable numbers was a very young plantation of poplar, birch and elm; the plants not more than two feet high. I generally found from three to six on a little poplar.—*Id.*

Description of the Larva of Thyatira Batis.—Drab, along dorsal region mixed with light olive. Head large, bifid (tips rounded). Slight bifid hump on 2nd segment, and a higher bifid hump on 3rd, where the points are curved and incline forwards; simple humps on segments 6th to 8th inclusive; raised ridge on 12th. The skin along the sides is puckered, especially on segments 5th and 6th, where it is swollen out laterally. On the 5th is a largeish black dot, with a smaller one on each side. Looking along the back from behind, the hinder faces of the tubercles are drab in triangular patches, the sides and fronts olive. Claspers elevated behind when at rest.—*Id.*

Capture of Acronycta strigosa in Cambridgeshire.—On the 3rd of last July I captured a specimen of this moth at sugar. Last year I was fortunate enough to capture several pairs. *Acronycta strigosa* prefers a covered situation in the immediate vicinity of young ash trees. It takes sugar freely. Its flight is low, undulating, and even slow. Most of my specimens I took either after a slight shower of rain or during a brisk breeze. One might easily pass this insect over, as it sits particularly close, with closed wings, and its colouring being so near to the small knobs of the grayish white of the ash as to be distinguished with difficulty therefrom. This year is decidedly an unpropitious one as far as Cambridgeshire is concerned, many common species not having made their appearance at all.—*S. P. Saville ; Dover House, Cambridge, July 23, 1861.*

Description of the Larva of Botys fuscalis.—Does not feign death when disturbed, but affects its escape with considerable rapidity. Head rather small; body rather attenuated towards both extremities; the segmental divisions strongly marked. Head black, shining; body pink or flesh-coloured, each segment having eight very depressed brownish warts; the 2nd segment has a transverse, dorsal, shining corneous black plate divided by a median pale line. Feeds on the seeds of *Rhinanthus Crista-galli* (yellow rattle), first enclosing itself in a hammock composed of two united sepals. Full fed July 15th. I am indebted to the Rev. Hugh A. Stowell for a supply of these larvæ, accompanied by a supply of their food, so that I had an excellent opportunity of observing their singular economy.—*Edward Newman.*

Description of the Larva of Catoptria ulicetana.—As I was walking along a railway bank I noticed two or three plants of *Genista anglica* covered with its swollen pods, and I opened one out of curiosity. Inside was the larva of which the following is a description:—Yellowish green; spots minute, black. Head dark chestnut, shining; also the shield, except the front, which is green. When full fed the green tint disappears from the body, and the head and shield are entirely light brown. On opening other pods I found most of them tenanted, although not the smallest hole could be seen in any of them. I collected a good number of pods, thinking the insect might be some local *Endopisa*, from its feeding on the seeds of a leguminous plant, like that genus; but only two specimens of the moth have come out, owing to the difficulty of rearing it. These, however, are quite enough to identify the species. The first appeared August 17th, from an earthy cocoon just below the surface of the soil. Now I suppose that this larva feeds generally in the pods of *Ulex*, among which the perfect insect is always found, but that it has no objection to kindred plants when that is wanting.—*E. Horton ; Wick, Worcester, August 22, 1861.*

Entomological Notes from South Wales.—I fear these notes will be meagre, owing partly to the bad weather (scarcely a day having passed without rain), partly to the bad season, and partly, I think, to the unfavourable locality, the iron and coal basin of the neighbourhood of Aberdare. Of course I did not expect much in the midst of coal-dust and sulphureous smoke, and therefore had to make excursions some miles away, where the woods and mountains were still uncontaminated, where fresher lichens enlivened the rocks, and the bark of the trees was of its natural colour. Even here, however, I was much disappointed by the fewness and commonness of the Lepidoptera. The loveliest wild places one could conceive often produced nothing but what might have been taken in one's own garden at home. Sheltered nooks in woods, protected from the wind but open to the sunshine, showed no butterfly. Grassy hollows on the mountain side, where local *Crambina* were reasonably

expected, were drawn blank. Had I been only a dipterologist, what execution could I have done! but as it was I was the executed. Myriads of monstrous Tabanina, such as I never saw out of Wales, rose from every cover, and plumped down upon every bit of bare skin on my body. There was I, "in the right place" for Diptera, but unfortunately I was not "the right man" except for their operations. The following were my only captures of the perfect insects, with the exception of the commonest kinds, all taken between June 27th and July 11th:—*Euthemonia russula* (worn), *Hadena contigua*, *Hepialus hectus*, *Cymatophora duplaris*, *Melanippe procellata*, *Ephyra trilinearia* (worn), *Asthenes sylvata*, *Eupithecia tenuiata*, *Botys lancealis*, *Crambus inquinatellus*, *C. perlellus*, *Pædisca occultana*, *Penthina picana*, *Tortrix adjunctana*, *T. cratægana*, *Peronea ferrugana*, *Cochylis stramineana*, *Prays Curtisellus* (dingy variety), *Depressaria assimilella*, *Lithocolletis ulmifoliella*, *Argyresthia retinella*, *A. Brockeella*, *Elachista adscitella*, *Cemiostoma spartifoliella*, *Pterophorus osteodactylus*. I took the following larvæ:—*Platypteryx hamula*, on birch; *Dicranura vinula*, poplar and willow; *Notodonta ziczac*, poplar; *N. Dromedarius*, birch; *Clostera reclusa*, poplar; *Thyatira Batis*, bramble; *Catoptria ulicetana*, *Genista anglica*.—*E. Horton*; *Wick, Worcester, August 22, 1861.*

Bluebottles and Ants.—A day or two ago I picked up a pear lying on the garden walk, and as quickly put it down again on finding some half-a-hundred ants clustering on the under side, which was much eaten away. Yesterday morning the pear was gone, but several bluebottle flies were collected on the spot, evidently attracted by some fruity matter remaining on the gravel. These flies were in the thoroughfare of a nest of the small black ant, and I was struck by the vigilance displayed by the flies in avoiding contact with their Hymenopterous comrades; the bluebottles edged away the moment an ant came within half an inch of one, though the latter seemed unaware of their presence. It was a busy scene, there being fourteen or fifteen bluebottles and much more than as many ants in constant movement, the flies often springing up an inch or two to avoid contact with the ants, but the latter did not appear to make any attempt to seize them. The care displayed by the large bluebottles to avoid their diminutive neighbours argues an instinctive dread of the latter as real as that entertained by a small bird for a hawk, accompanied with an apparent consciousness of safety as long as absolute contact was avoided.—*George Guyon*; *Richmond, Surrey, August 15, 1861.*

On Phryganidæ and their Parasites.—Science has to thank Mr. Walker for one of the most interesting discoveries, in the observation that Hymenoptera (*Agriotypus armatus*) go under water in order to deposit their eggs in the larvæ of Phryganidæ. It seems very extraordinary that creatures which appear only adapted to live in the air should be capable of remaining under water for some time in order to execute certain operations. It had been already previously observed that *Phryganea grandis* goes under water in order to lay its eggs, and subsequently this observation was repeated amongst the Agrionidæ, in *Lestes*, for instance. Here the male is so polite as to accompany the female under water. The process of respiration is, however, assisted during the short period necessary by the layer of air on the abdomen which the insect takes under water with it. It has also been long known that some Diptera are parasitic in the larvæ of Phryganidæ, but I am not aware that the species are known. Some species of Phryganidæ, especially *Silo pallipes* (which is not scarce in May in hedges near Lewisham) are much infested with the parasitic *Agriotypus*. Von Siebold has made a very interesting discovery respecting these insects; namely,

that the larva of a Phryganideous insect, which is infested by a parasite, before changing to a pupa, spins a long firm thread by which it attaches its case: we can only consider this gift of spinning as a morbid craving—a species of excitement caused by the parasites within. According to Von Siebold's observations, the cases which contain parasites are always fastened by a thread, whilst all others are without a thread. This circumstance much facilitates the detection of the parasites. If one takes out of the water a stone on which there are cases of Phryganidæ, those fastened with long threads readily attract attention. No doubt more than one species of ichneumon occurs in the larvæ of Phryganidæ. For instance, Von Siebold possesses cases and larvæ of *Molanna cylindrica* with considerably larger threads, and evidently larger parasites, yet the imago is still unknown. It seems highly probable that the same facts will occur in England as in Germany, and therefore it would be interesting to direct attention to the subject, and to try and breed these parasites. In breeding Phryganidæ some care is necessary; if the cases are brought out of the water and placed in a glass they almost invariably die; but the following method will be found more successful:—take a bag of some transparent substance, place some switches in it, so as to keep it open, then put the Phryganidæ cases in, tie it up at the top, and sink it in the water, so that a portion of the bag lies above the surface; in this way, with very little trouble and expense, one can succeed in rearing the perfect insects.—*Dr. Hagen, in the 'Intelligencer'.*

Correction of an Error.—At the meetings of the Entomological Society, held June 3rd and August 5th of the present year, Dr. Knaggs and Mr. M'Lachlan exhibited, on my behalf, drawings of the larvæ of *Eupithecia trisignata*, *E. tripunctata*, *E. dodoneata*, *E. pusillata*, *Caradrina alsines* and *C. blanda*. In the reports of those meetings (*Zool.* 7615 and 7726) it is stated that these drawings were executed by me. This is quite incorrect. I am entirely unable to produce such excellent and life-like representations. They proceed from the clever pencil of my friend Mr. Buckler, who is perhaps the most painstaking and accurate depicter of the larvæ of British Lepidoptera we have the good fortune to possess. I am exceedingly sorry that the mistake has occurred, and that all honour was not paid where it was so justly due.—*H. Harpur Crewe; September 6.*

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

September 2, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘The Journal of the Royal Agricultural Society of England,’ vol. xxii. part 1; presented by the Society. ‘Stettiner Entomologische Zeitung,’ 1861, Nos. 7—9; by the Society. ‘The ‘Zoologist’ for September; by the Editor. ‘Beschrijvingen en Aferldingen van Nederlandsche Oolinders, bijeengebragt door Mr. S. C. Snellen Van Vollenhoven, Conservator aan’s Rijks-Museum voor Natumljke Historie te Leyden;’ by the Author. ‘The Journal of the Society of Arts’ for August; by the Society. ‘The Entomologist’s Weekly Intelligencer,’ Nos. 253—256; by the Editor, H. T. Stainton, Esq.

Exhibitions.

Mr. Scott exhibited the following Hemiptera, hitherto unknown as British species, viz. :—

Acetropis carinata, H.-Sch. = *Lopus carinata*. Found by Mr. Marshall in the New Forest.

A. seticulosa, Fieb. Also taken by Mr. Marshall in the New Forest.

Piezostethus bicolor, Scholtz. (*Xylocoris*, H.-Sch.) Taken by himself beneath bark, at Abergavenny, in September last.

Anthocoris austriacus, Hahn. Beaten from oak trees at Wickham this month. It appears to be a very common species.

The President exhibited a specimen of a large Noctua, *Orodesma apicina*, Guen. MSS., found alive in the London Docks, on board a vessel recently arrived from Porto Rico. It was, he remarked, the same species as was exhibited at a former meeting of the Society by Dr. Allchin, and recorded in 'The Entomologist's Weekly Intelligencer' by Messrs. Edmonds and Hodgkinson. The only known specimens have been captured in England.

Mr. M'Lachlan exhibited two new British species of Phryganidæ, viz., *Agrypnia picta*, Kolen., of which a specimen was taken on Skiddaw in 1859 by Mr. T. Chapman, and *Leptocerus fulvus*, Rambur, of which many specimens were taken during the month of August at Ruislip, Middlesex, by Mr. P. C. Wormald.

Mr. Stevens exhibited fine examples of *Dicranorrhina Layardi* from South Africa, and a new species of *Paussus* from Rangoon.

Mr. Stevens also brought for distribution amongst the members some specimens of *Triplax russica*, lately bred from Fungi.

Mr. Stainton exhibited a fine pair of *Nonagria Elymi*, sent from Stettin. He observed that the species had during the present season been discovered in Britain, and he had exhibited two wasted indigenous examples at the previous meeting of the Society.

Mr. Stainton also exhibited a male example of *Lasiocampa Quercus*, received from the Rev. F. O. Morris, having the antennæ much shorter than usual; they had not however been subjected to microscopical examination.

Mr. Bond exhibited examples of *Lithosia caniola* and *Dianthœcia capsophila*, captured near Dublin by Mr. Barrett. The first-mentioned species was noticed as a native of Britain for the first time by Mr. Henry Doubleday (Zool. 7407).

Dr. Knaggs exhibited a Noctua, allied to *Hadena protea*, but evidently distinct from any known British species, taken by Mr. Barrett near Dublin. He had been unable to identify it with any species contained in the general collection at the British Museum.

Mr. Brettingham exhibited a large box of Coleoptera from Assam.

Professor Westwood exhibited two examples of a large North-American species of *Sphex*, from the Oxford Museum, the bodies and limbs of which he had lately noticed to be covered with pollen masses. Instances of the adhesion of the anthers of flowers to the heads of insects had been brought before the Society on former occasions, but he had hitherto never seen any instance of the whole insect being covered with them.

M. F. Walker communicated some notes on the habits of *Lipara lucens*, *Chlorops tarsata*, *Limnophora mediteroides*, and their parasites, with descriptions of the insects.

A popular Treatise on the Fur-bearing Animals of the Mackenzie River District. By BERNARD ROGAN ROSS, C.T.*

IN submitting the following treatise to the notice of the Natural History Society of Montreal, I will, previously to entering on my subject, mark out the extent of country to which only my remarks apply.

A residence of thirteen years in this district, during the greatest part of which I have been a not unsuccessful trapper, has afforded me many opportunities of observation upon the nature and habits of the various fur-bearing animals inhabiting these high northern latitudes. I have throughout studied accuracy rather than effect, and the style of my remarks is doubtless rather popular than scientific; yet the hope that my humble endeavours may perchance clear one doubtful point, or illustrate some new truth, has lightened my labour, and will, if such should in reality happen, prove an ample recompense for my toil.

The boundaries of the Mackenzie River district may be considered to extend from Salt River, a tributary of the Slave to the Arctic Sea, and from 100° W. long. to the Rocky Mountains.

I cannot here omit mentioning the aid which I have received, in the scientific parts of the treatise, from the splendid, complete, and accurate work of Professor Baird on North American Mammals. The general characteristics of families are quoted *verbatim* from his work.

Lynx canadensis. Size between that of a fox and wolf. Tail thickly furred, shorter than the head and tipped with black. Paws densely covered with hair, and armed with strong claws. Colour in winter a silver gray on the back, paling towards the belly, which is sometimes white; a rufous under shade mixes with tints. The ears are pointed, not large, and tipped with a pencil of long black hairs. Whiskers generally white. Length from the tip of the nose to the tip of the tail about 3 feet. Average weight about 25 lbs.

This species is the largest of the North American lynxes, and is the only one found in the Mackenzie River district. It is called by the "winterers" indifferently either "lynx cat," "loup cervier" or "pichen." In appearance it is rather formidable; its teeth are long and sharp, while its powerful claws and immense spring render it a dangerous

* Presented to the Natural History Society of Montreal, and published in the 'Canadian Naturalist,' Vol. vi. No. 1.

opponent to any animal that it encounters. In its habits it is predatory. Hares and mice it devours with avidity; birds it pursues to the tops of the loftiest trees, and it even kills fish in their own element; while it has no objection to carrion, and, when pressed by hunger, will even eat its own kind. Tales of the ferocity of this animal have been told by the early writers, of its attacking and mastering deer, but they are without foundation. It is a solitary beast, and I should consider its unaided strength perfectly incompetent for such a purpose.

In its motions, though very active, the lynx is rather an ungainly animal. Its favourite pace is a succession of long leaps, much in the manner of the American hare (*Lepus americanus*), which it also slightly resembles in shape. It is stupid and easily caught. A sudden and loud cry from the hunter pursuing it is sufficient to arrest its course for a time long enough to permit him to fire, and sometimes several shots are obtained at the same animal in this manner. It is easily killed, a not very heavy blow being sufficient to fracture its skull.

The colour of the fur varies much with the seasons. In winter the hair is thick, long and silky. The gray markings are of a dark silver colour, while the rufous under shade is scarcely observable. In some specimens the dark stripe down the back would not disgrace a silver fox. In summer it wears a rusty look, the hair is short and thin, and there is more rufous and little of the silvery gray in the tints, while the skin is marked with black spots, which serve to distinguish a prime from a common fur in trading with the natives. These spots appear generally in April and disappear in November.

The lynx is found all over this district, in greater or lesser numbers, wherever there are trees, even within the Arctic Circle. It is subject, like most of the other fur animals, to periodical migrations, which appear to occur with great regularity in periods of ten years, and which in its case depends on the hare, its principal food. One of the most curious of the idiosyncrasies of this animal is its passion for perfumes, and particularly for the odour of castoreum, which forms the basis of all the "medicines" used by trappers in effecting the capture of the lynx.

There are four methods in which the death or capture of the lynx is effected,—by hunting, by the use of the steel-trap or gin, by the simple snare, and by the medicated cabin,—all of which I shall pass briefly in review.

By hunting:—In this method the hunter pursues the animal, generally aided by a dog, and follows its track in the snow until he forces

it to take refuge in a tree, when it is shot; yet so tenacious is the death-grip of its powerful claws, that it is sometimes necessary for him to fell the tree in order to obtain the body.

By the steel-trap:—The gin, covered inside the jaws with a well-fitting “pallet” of birch bark, is placed indifferently either under or upon the snow, and on the pallet a piece of hare-skin, well-rubbed with the “medicine” is tied. The lynx, on scenting his favourite perfume, endeavours to withdraw the skin with his paw, and consequently springs the trap. It does not, like most of the other fur animals, drag the trap to a distance or make violent efforts to escape; it generally lies down until aroused by the approach of the hunter, when it endeavours rather to spring at him than to take to flight.

By the simple snare:—A running-noose of platted sinew, thread or deer-hide thongs, is set in the track that the animal usually follows; this snare is attached to a pole of sufficient weight to toss up the body, and it remains hanging until the hunter passes. The body is sometimes found devoured by crows, wolverines and lynx.

By the medicated cabin:—This is the most efficacious method of catching the lynx. A round enclosure of some three feet in diameter is made of small willows or branches of trees, loosely planted in the snow, and about four feet high. Two entrances are left at the opposite sides, each fitted with a snare. In the centre of the enclosure the medicated skin is placed, inserted in a cleft stick, about eight inches distant from the snow. The snare is more commonly tied to the middle of a loose stick, about 30 inches long by 3 inches in diameter, and which is supported on two pronged branches set on each side of the entrance; when circumstances are favourable the tossing pole is sometimes used, and it is the most certain fashion. The animal on scenting the castoreum inserts its head, or sometimes its fore foot into the noose, which, owing to the long tips on the lynx’s ears, remains securely on the neck when once passed there. After enjoying and rolling itself in the perfume it moves off, but on finding the stick thumping after its heels it becomes alarmed, and makes for the nearest woods; the stick soon catches in the bushes, and in a short time the animal, instead of cutting the line, strangles itself, or, if caught by the paw, remains fixed until the hunter arrives to give it a *coup de grâce*, if he does not find it already frozen stiff. On some occasions it will gain the top of a lofty tree, and on springing off to rid itself, as it fancies, of the stick it hangs itself in a superior manner, and puts the trapper to the trouble of cutting down the tree, which is generally a large one.

As an article of food the flesh of the lynx is highly esteemed, both by the natives and the white residents: it is of a light colour and well-flavoured, the fat, which is soft, like that of the bear, lying mostly on the ribs.

Gray or Strongwood Wolf (*Canis (Lupus) occidentalis*, var. *griseus*).—Size that of a large mastiff dog, but stands rather higher. Hair long, and not coarse; under fur very thick and woolly. Tail very full, but not so long in proportion as that of a fox. Colour varies: in barren grounds variety generally white; in strong wood dark gray. Length, from the tip of the nose to the tip of the tail, about $6\frac{1}{2}$ feet. Weight about 50 lbs.

This is the only species of wolf in the Mackenzie River district; but I am inclined to divide it into two varieties—the dark gray, or the strong wood, and the white, or barren ground. These two are doubtless the same species, though in colouring, locality and habits there is a considerable difference between them.

The general appearance of both varieties of wolf is rather prepossessing, resembling a good deal that of the native dogs. The head is full, broad between the ears, and tapering towards the snout. The legs, though rather long, are stout with good muscular development. The paws are large, furnished with strong claws, and well furred. The teeth are long and white, and the jaws are of immense power. The eyes are placed obliquely, the inner corner tending downwards. The tail is moderately long and very bushy.

The white wolf is found inhabiting the barren grounds and the wooded country bordering on them, its migrations being dependent on the movements of the rein deer, its principal food. This kind of wolf lives in considerable bands, which unite in hunting parties to run down or surround the deer, driving them over cliffs or into rivers or lakes, as is most convenient. In size they are smaller than the gray variety, though much larger than the prairie wolf. Their colour is generally a dirty yellowish white, with most commonly a stripe of gray down the back, but not always.

The dark gray, or strong-wood variety, which I have styled “*argentatus*,” from the resemblance of its colour to that of the silver fox, inhabits the wooded country. It most commonly is seen alone, but as many as six have been observed in a band. The only specimens of its skin which I have seen were received at Fort Resolution, on Great Slave Lake, and is evidently still rarer among wolves than the silver is among foxes. In its full winter pelage it is a magni-

ficient animal. The colour is a dark silver gray, with a rather browner tint than that of the silver fox; under the belly a bluish black; the nose and paws black. The size of an old specimen is enormous, the skin being as large, when stretched and dried, as that of a barren ground reindeer.

The northern wolf is a very knowing animal, quite as much so as the fox: out of an immense number which I have heard, I will relate a few well-authenticated anecdotes about it, most of which have fallen under my own observation.

In the month of May, when the holes cut in the ice do not freeze up, the fisherman at Fort Resolution, on visiting his trout lines, set at some distance from the fort, discovered that several had been visited; the lines and hooks were lying on the ice, as well as the remains of a partly-eaten trout, and a wolf's track was observed about the place. The fact was that the wolf had hauled up the lines, and helped himself to what fish he required. This occurred again, and then ceased, the animal having been probably driven away by the dogs of the post. I have never heard of a wolf attacking man, though a dog has been carried off from the winter encampment now and then. When there is but a single wolf, one of our hauling dogs, which are a powerful cross between the pointer and native dog, will make a good fight, and often beat off his opponent. The wolf, when taken young, is easily domesticated: it is affectionate and docile to its master, but snappish with strangers, and rather quarrelsome with the dogs. A cross between a male wolf and a domestic bitch makes an excellent breed: the offspring are hardy, docile and strong, easily fed and capable of enduring great fatigue: these hybrids will, contrary to the general rule, have young ones. When there are not too many dogs to drive him off a male wolf will sometimes have connection with a bitch belonging to the fort, but I am doubtful if a female wolf would permit the attentions of a domestic dog. In the copulating season wolves become rabid, at which time their bite is generally fatal to dogs and other animals. Fearful of expatiating at too great a length upon the subject, I will conclude this anecdotal paragraph by a testimony to the sociability of the wolf, even in a wild state. A full-grown wolf remained, during the months of July and August, 1857, quite domesticated, at Fort Resolution: though rather shy of the people it lived in great harmony with the dogs, playing and sleeping with them, and sharing their food: around the smoke made to keep off the myriads of noxious flies from the cattle it reposed with the other animals, and, although there was a small calf in the band, it never attempted mischief. It was shot at by

an Indian and never seen after. Wolves, when pressed by hunger, often come into the square of the fort, and one was shot once when endeavouring to effect an entrance into a meat store.

There are five methods by which wolves are captured or destroyed—by the pitfall, by the gin, by the trap, by the set-gun, and by poison.

By the pitfall:—This method is tolerably successful. A hole about seven feet deep, broader at the bottom than at the top, is dug during the summer: it is covered with twigs and grass, and after the first fall of snow bears the same appearance as the surrounding ground. In the centre of the hole the bait is laid, and on approaching the animal falls into the pit, when he is easily killed.

By the gin or steel-trap:—The trap is set in the usual manner, covered with snow and baited; when caught the wolf struggles violently, and if the trap be not very strong will escape, after which he is very difficult to catch, as he will begin digging at some distance from the trap, which, when reached, he will throw aside with his nose, and devour the bait at his leisure. Once securely caught the wolf will take the bar of wood, to which the trap is fixed by an iron chain, in his mouth, and trot off at a desperate pace, seeking the worst country he can find. I was once obliged to follow a wolf two days in this manner, and only secured him in the end by the aid of dogs.

By the wooden trap:—A large trap of strong pieces of wood is made. First stakes are driven into the earth enclosing a circular space, with two convenient saplings for door-posts, a log of wood or sleeper is laid across the door, at the foot of these, with another longer and lighter piece on the top, for the purpose of being lifted up when set. The roof of the trap is then covered with small sticks and brush, some logs of wood are laid as weights on the upper piece lying across the door, and a strong stake is driven into the ground, to prevent the animal when caught from hauling the top piece off the sleeper. The trap is then prepared for setting; to effect this some of the weights are thrown off, and one end of the top piece lifted sufficiently high to permit a stick about a foot long to be inserted upon the butt of the bait-stick, which is about eighteen inches long, with a piece of fish or meat fixed on the point, and is placed inside the trap. The weights are then replaced, and some pine brush thrown loosely on the top. This fashion of catching wolves is not very successful, except in the fall and beginning of winter.

By the set-gun:—This is a very sure method, though rather dangerous to the hunter, if he do not take great care. The gun is tied upon two saplings or stakes, set on purpose; opposite the trigger is

another thinner stick firmly planted on the ground ; a piece of wood is laid across this stick, one end pressing the trigger, the other attached to a line to the other extremity of which the bait is affixed. This line is carried under the snow by boring holes in pieces of board and passing it through them ; this also prevents the animal from pulling the bait out of the aim of the gun, which he discharges as soon as he hauls upon the line to obtain the meat. Instances have been known of wolves cutting the line close to the trigger of the gun, after which they eat the bait in safety.

By poison :—In this case strychnine is used, which is an infallible method, though the animals sometimes go to such a distance that it is difficult to follow their tracks ; and if a fall of snow come after they have eaten the bait their bodies are often lost. About two grains are required to kill a wolf quickly. But I will defer the detailed account of the effect of strychnine on wild animals until I write the article upon foxes.

Esquimaux Dog (*Canis familiaris*, var. *borealis*) and Hare Indian Dog (var. *lagopus*).—Size of both about that of a pointer. Ears small and pointed. Head broad between ears, and tapering towards muzzle. Colour varied, but whites and grays predominate. Hair long and fine mixed, with thick under fur. Tail long and bushy. General appearance that of a wolf.

In comprising the Hare Indian and Esquimaux dogs among the fur-bearing animals of this district, I am perfectly aware that, in a commercial point of view, they are not included among them ; still, from their wild nature, as well as their long and thick fur, I consider that I may with strict propriety class them in the branch of Natural History upon which these notices treat. I should also wish to point out a few errors into which previous writers on these animals have fallen, as well as to submit to the philosophical world some of the results of my experiments and investigations in this branch of animated nature.

The Esquimaux dog (var. *borealis*) is found, as its name implies, among the Husky tribes of the Arctic coast. It is of considerable size, muscular and well-proportioned. The ears are small and pointed, and with a good breadth of skull between them ; the muzzle is long and sharp ; the eyes are placed at angles, not horizontally ; the fur is deep and thick ; the tail bushy ; the feet broad and well covered ; and the colour is generally pure white, though other shades are not uncommon.

It is said, with what correctness I cannot venture to say, that the

voice of the Esquimaux dog in its native wilds is not a bark, but a long, melancholy howl. I have had several in my possession, all of which barked lustily, but they may have learnt this accomplishment from the dogs of the fort. The similarity of appearance between this dog and the barren ground wolf is very great. It is a hardy animal, capable of enduring great extremes of cold and hunger; but in the latter case it becomes very ferocious, and instances have occurred of children being devoured by it.

There is no want of sagacity in the Esquimaux dog; its whole look tells of its wisdom and cunning. It is very sociable and fond of its master. When two of this breed of dogs begin fighting the whole band light on one of the pair, and if not prevented will tear him in pieces.

The Hare Indian dog (var. *lagopus*) is the race domesticated among the Indians of the Mackenzie River district. It is characterized by a narrow, elongated and pointed muzzle, by erect sharp ears, and by a bushy tail not carried erect, but only slightly curved upwards, as well as by a fine silky hair, mixed with thick under fur. Its colour is tolerably varied in the shades of brown, gray, black and white. Of these tints the darkest are the most rare, a white or grayish white being the most usual shade. Some writers have supposed this animal to be a domesticated white fox, but the thing is highly improbable. The Indian dog, though there are great differences in its size, has on an average more than treble the proportions of this species of fox; moreover, it will not have connection with this or any other branch of the subfamily *Vulpinæ*, while its varied shades of colour are never seen in the pure white pelt of the arctic fox; with wolves, on the contrary, not only will they cohabit, but will also produce a hybrid offspring that will for several generations procreate one with another. This fact manifests the close connection that both these varieties of dogs have to the wolves, and would almost prove them identical. Thus far I admit, but I do not, for reasons which I shall afterwards give, consider them only domesticated wolves. They are, in my opinion, specimens rather of the parent canine stock unaltered by human experiments, and in appearance such as Adam might have named in the garden of Eden.

With foxes of any description neither these nor any other dogs will copulate. At Fort Resolution I had a very fine pair of cross foxes in confinement: they were kept within a roomy enclosure surmounted with lofty stockades; one of the windows of my dwelling-house commanded this enclosure, and at it I used to spend hours

observing their actions and movements. When the bitch fox went in heat in the spring she had connection with her mate; and wishing to decide upon the extent of the affinity existing between the fox and the dog I shut up a small terrier with her: there was no courtship; the parties were mutually indifferent. I tried Indian, half-Indian and our own hauling dogs, but with no success; they evidently would not enter into a matrimonial speculation, though they were friendly enough. This experiment may perhaps be allowed to decide the case in point.

Wild dogs are known to exist in many countries. The Ajuara of South America, the Dhol of India, and the Dingo of Australia, for instance, all bear a close resemblance to each other and to the Arctic American dogs, in the most essential particulars. Therefore, seeing that wild dogs, as distinct from wolves, exist, it is to some such animal that I am inclined to attribute the origin of the dog. From the earliest ages the dog and wolf have been distinguished from each other, and the varieties to which this article is devoted may have derived their certainly very wolfish appearance from crosses in the breed.

Whatever be the origin of these animals they are of the greatest service—in fact, a necessity—to the aboriginal dwellers in these dreary and barbarous wilds. They are the only beasts of burthen, and although they have not the strength of the fort dogs, still a train or team of three good ones will haul a load of upwards of three hundred pounds, five hundred being considered a good load for the others. Their life is a hard one, far worse than that of a tinker's jackass; a blow or a kick is the usual caress bestowed upon them by their master. Their food is mostly the excrement and offal of the camp—hare-skins and paws, and any other trash too wretched for the far-from-nice stomach of a Chipewayan Indian. I have seldom or ever seen a fat dog among the natives. They make very good hounds to follow deer or moose on the crust of the snow in spring; for, though they have not sufficient strength to bring down these animals themselves, they retard their progress sufficiently to allow the approach of the hunter. I have seen some tolerable retrievers among them also.

I will now conclude this article by offering a just tribute to the affectionate disposition and kindly habits of this poor and ill-used "friend of man." Scanty fare, harsh treatment and want seem to make little difference in his love; and these miserable starvelings show as much, if not more, affection for their hard-hearted and tyrannical master than do the pampered and petted favourites of European old maidenhood:

Common American Fox (*Vulpus fulves*): Red Fox (var. *fulvus*), Cross Fox (var. *decussatus*) and Silver Fox (var. *argentatus*).—Hair long, silky and soft. Tail very full, composed of an under fur, with long hairs distributed uniformly along it. Tail with white tip. Feet and ears black. *Var. fulvus*.—Reddish yellow; back behind grizzled with grayish; throat and narrow line on the belly white; ears behind and tips of caudal hairs (except terminal brush) black. *Var. decussatus*.—Muzzle and under parts with legs black; tail blacker than in the other variety; a dark band between the shoulder, crossed by another over the shoulder. *Var. argentatus*.—Entirely black, except on the posterior part of the back, where the hairs are annulated with gray, this occasionally wanting; tail tipped with white.

In treating on the different varieties of foxes I have spoken of it is extremely difficult to mark the line where one ends and the other commences. During my residence in these regions I have seen every shade of colour among them, from a bright flame tint to a perfectly black pelt, always excepting the tip of the tail, which in all cases is white. Even the judgment of an experienced fur trader is sometimes at fault to decide, in bartering, to which of the three varieties a skin should belong, as they bear different prices. Still, notwithstanding this, I consider these colours to have been produced by intermixture of breed, the different varieties being, in my opinion, quite as distinct as those of the human race; and I do not think that any of the progeny of two pairs of red foxes would be either black or cross. In cohabiting the male foxes accompany the females in bands of from three to ten, much in the manner of domestic dogs: at Durwegan, on Peace River, I have repeatedly observed this. The males fight violently for the possession of the females; many are maimed and some killed. A number of males thus, in all likelihood, cohabit with the same female, which gives rise to the varieties of colour in a litter. Instances are reported as having occurred in which all the varieties were taken in one den, but of this I am rather doubtful. It is very difficult to tell the future colour of cub foxes; the red appear to be cross, and the cross to be silver, which may have caused an error, though I write under correction: I have seen many Indians even mistaken in this; they have brought me live cub foxes for silver, which on growing up proved to be cross. My own theory is that the silver fox is the offspring of two silver parents, the cross of a silver and red, the red of two reds, and the different shades being caused by fresh inter-breeds. Thus two negroes will have neither white nor mulatto

children, nor will two whites have black or mulatto offspring. I do not know whether I have explained my ideas on the subject clearly or not: they are the result of my experience on a subject to which I have given no small attention. I have often robbed fox dens, and have also bred the animals, and the summing up of this part of my subject may be thus made: like colours reproduce like, black and red being origins; the cross is the fruit of intermixture between these shades. I kept a pair of cross foxes in confinement at Slave Lake; their offspring were all cross: I had only one litter when the bitch died.

Foxes are very shy animals and difficult to tame; indeed when old they appear to pine away in confinement; when young they are playful, but at all times rather snappish. They are far from sociable, and generally burrow alone, although it is not uncommon for the members of one family to live together.

The fox-burrow or den is often many yards in length, with various ramifications and side galleries to it, in the centre of which an excavation, rather wider than the passages, serves for the sleeping apartment; to this there are always two entrances, and often more. The den is kept very clean, and in some dozens which I have opened I found neither bones of animals nor offal of any kind. To dig out a fox a flat piece of iron, called an earth-chisel, is tied to a stout wooden handle; the trapper inserts a long slender pole of willow or other flexible wood into the entrance, having stopped up any other that exists, to find the direction in which the passage runs; he then digs another hole and inserts his pole, finding with its point whether any other passage exists, and if so marking the direction. In this manner he proceeds till he digs to where the fox is, who is generally killed in one of the side galleries, or close to one of the closed entrances. This method of killing a fox entails a large amount of labour, as it often takes a whole day to unearth the animal.

Of all the natural gifts of the fox the most remarkable is his exquisite sense of smell. When the fox finds a piece of meat or fish he almost invariably hides it, and returns to eat it at some future period: I have remarked this trait even in cubs which I have reared in confinement, and which used, previous to eating, to dig holes in the snow to bury their food, pushing the snow with their noses to cover it. During the commencement of summer he will lay up a store of the eggs of wild fowl, for his winter's consumption; these he deposits in holes dug in the sand-bars of the river or in beds of moss, and at the expiration of several months will, when pressed by want, visit his *caches*. Even when there are several feet of snow on his deposit he will readily

distinguish the place by scenting his urine, with which a fox invariably sprinkles in a liberal manner all his secret hoards.

This animal is by no means choice in his food: mice, birds, hares, fish, carrion, all come alike to him, and he will even make a meal of a fellow fox if he finds one dead in a trap. In summer a great number of young water-fowl are killed by him, and when musk rats are, by the freezing up of their houses, driven to migrate in the winter, he devours them without mercy.

Respecting any special difference between the three varieties I can see but very little. The cross fox is generally the largest, and the silver fox the most thickly furred. Some trappers profess to know by the shape of the foot whether a specimen be that of a silver fox or not, their idea being that the foot of that variety is more rounded than the others; but I have often seen them mistaken. The foot-prints of a young fox, of whatever colour, have always this appearance, and the foot of the female is more pointed than that of the male. A popular fallacy also prevails among the "winterers" that a silver fox is more cunning than one of any other colour. I imagine the scarcity of the silver variety originated this fancy.

The foxes of this district are generally of a very large size, and I am doubtful if they do not belong rather to the macrourous than the fulvous species.

The foxes inhabiting the barren grounds often present an appearance similar to that of the Sampson fox; the long hairs of the body and tail are wanting, leaving the soft woolly fur entirely exposed in some specimens, and in others partly so, particularly the sides of the thighs. The natives attribute this to their living so much in their holes, which are generally among rocks, and not roaming about so frequently as those inhabiting the wooded country, which often do not visit their dens for weeks together.

The following table shows the proportion of each colour traded in in this district during the last ten years, and will give a very accurate idea of the relative number of each variety:—

Red 6	Cross 7	Silver 2	=	15
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Foxes are most prevalent around the great lakes and on the shores of the Arctic Sea. On the Mackenzie River they are also tolerably numerous, but towards the mountains up the Liard's River they become very scarce.

There are several methods by which foxes are caught and killed, which I will pass in review, detailing those which differ from any

already described:—1, by wooden traps; 2, by gin or steel traps; 3, by set guns; 4, by snaring; 5, by hook and line; 6, by hunting; 7, by unearthing; 8, by ice trap; and 9, by poison. Nos. 1, 2, 3 and 7 have been already noticed, I shall therefore commence with

4. By snaring:—This is not a very efficacious method, and is used only by natives who have not steel traps or gins. An enclosure of twigs is made and the bait laid in the centre, and a snare set in the entrance, with a road fenced in like manner leading to it. The principle of construction is the same as in lynx snaring, and alike in every respect, excepting that the enclosure is larger. Foxes are sometimes found hung in snares set for rabbits.

5. By hook and line:—This cannot be exactly considered a legitimate method of entrapping foxes, though I have seen one killed by it. An Indian at our establishment was visiting and arranging his lines for catching loche (*Gadus lota*), when he observed a fox at a short distance from him regarding his operations; he immediately flung the baited hook towards it, and concealed himself behind a block of ice. Reynard approached, smelt rather suspiciously at the bait, and at length swallowed it, whereupon the Indian, without giving the animal time to cut the line, hauled in and killed it.

6. By hunting:—This method is practised in the fall, before there is enough snow to set the traps. The hunter conceals himself close to the fox's hole, and shoots him as he passes to it.

8. By ice traps:—This is a tolerably successful way, more so than by wooden traps. A block of ice of considerable weight is tilted on end, at an angle of about 45° , a piece of stick supports this, placed well under the block, the lower end resting on the bait. The animal, in his efforts to obtain the bait, drags the stick off the perpendicular, when the ice falls on him and kills him. This method is much used by the Yellow Knives to trap white foxes.

9. By poison:—For this purpose strychnia is used. I have tried aconitine, atropine and corrosive sublimate without success: the two former may not have been pure enough, though I obtained them from the first chemical works in England, and at a very high price. The only poison that I have found strong enough is strychnia. One or two grains of this are mixed with a little tallow, forming a small ball, and covered with a coating of grease outside to prevent the animal from tasting it. A quantity of pounded dried meat and morsels are strewn about, so that the animal after swallowing the poison may be detained a sufficient time for it to operate. The distances which animals go before they die vary greatly; in some instances they fall directly, in others they

run several miles with the same dose arranged in like manner: this I attribute to several causes; to their fatness and to the quantity of food in their stomachs, as lean and hungry foxes die much more quickly than others. The medium in which the poison is given also causes a great difference: when put up in fresh meat a very long time elapses before it operates. Wishing to preserve a specimen of the Hare-Indian dog for the Smithsonian Institution, I resolved to kill the animal by poison: two grains of strychnia of the first strength were administered in a piece of fresh meat; at the end of two hours the animal was as well as ever: I then administered one grain more, mixed with grease; in two minutes the spasms began, and in five the animal was dead. The first symptoms were a restlessness and contraction of the pupil of the eye, and a flow of saliva from the mouth; violent cramps then ensued, the head shook violently, like a paralytic person, the legs were drawn up, and the spine took a circular shape; a lull of a few seconds then ensued, when, after an attack of great violence, the animal died. On dissection the blood-vessels of the head and neck were found very full of black and clotted blood, such as I have seen in the jugular vein of a person who had died of apoplexy; there was no inflammation of the stomach, and the fatal bait was found in the throat entire. Once seen the symptoms of poisoning by strychnia are easily recognised, and I could be certain now of passing a correct opinion on a case of the kind. Dogs take a longer time to expire than either wolves or foxes, the latter dying most quickly; in fact, according to the ratio of the wild nature of the animal who eats it will be the quickness and violence of its death.

Arctic Fox (*Vulpes lagopus*): White Fox (var. *lagopus*).—Smaller than the American red fox. Tail very full and bushy. Soles of feet densely furred. Tip of nose black.

This diminutive fox, which is about as large as a small terrier, inhabits the barren grounds and sea-coast of this district. On only two occasions have I known it to be caught on the south side of Slave Lake, once at Resolution, and once at Big Island. Its fur is thick, about two inches long, white in colour, with the under fur a lead tint. In winter the animal is white all over, excepting the tip of the nose, which is black; a light shade of lead is, however, visible on the shanks and feet; these are densely furred, and the nails are brown. In summer the fur is about an inch in length, white beneath the belly, but owing to the falling off of the long hairs a stripe of plumbeous gray, annulated with white, and about three inches broad, extends from the

nape of the neck to the tail, widening towards the rump, and passing over the tops of the thighs. The whiskers, white in winter, have brown hairs intermixed, and a yellowish tint surrounds the ears, eyes and mouth, and tinges the shanks and feet. A few long dark hairs may be perceived by careful examination sprinkled down the back, and the tail has a slight plumbeous shade mixed with faint yellow. The colour does not approximate in either summer or winter pelage to that of the blue fox, which has been erroneously stated to be the young of the white. The white fox measures, in a good specimen which I have before me, 22 inches from the tip of the nose to the root of the tail, which measures 13 inches to the end of the hairs. It is an extremely stupid animal, easily killed and very tame. It is sometimes knocked on the head in open day, while following the sleds of the Indians. It lives on mice, carrion, birds, especially ptarmigan, to which it is a deadly enemy.

Blue Fox (var. *borealis*).—Similar to the white in every particular except that of colour.

In the lack of positive information upon the subject, I am uncertain whether to consider this as a mere variety of the white fox or to class it as a distinct species, but I will for the present consider it as the former.

The Arctic blue fox measures 35 inches from the tip of the nose to the root of the tail, which is 13 inches in length to the end of the hairs. Its colour in winter is a plumbeous-brown; the under fur plumbeous, and the larger hairs brown at the tips, with white hairs interspersed, but not in great numbers. On the head and nape of the neck the colour is a reddish gray, like the tint of a silver fox in summer pelage. Under the throat down to the chest the colour is nearly a pure chocolate, paling on the belly into a shade similar to that of the back; the sides and flanks are nearly pure plumbeous, mingled with white hairs. The legs are brownish gray, and the fur, which covers the soles of the feet densely, is a dirty white. The claws are nearly an inch long, brown in colour, strong and well curved. The tail is of a like tint with the back, but of a lighter shade. The nose is reddish, with a black tip. The fur is remarkably thick and fine, and the tail very full. In summer pelage it is difficult to define the colour, but it may be called a smoky brown; on the forehead the gray of the winter coat still remains, and there is also a faint stripe of the same shade down the centre of the back. There is less of the reddish tint throughout than in the winter fur.

It has been supposed that the blue fox is the young of the white fox, but this I do not think possible. The specimen now before me is full grown, and in fact it would be a very large animal of the other colour. The colour is also very rare, for while hundreds of white are traded, not more than six, on an average, of the blue are exported yearly from this district. If they were the young of the white the number would be certainly greater. What are traded are all obtained from the Esquimaux inhabiting the sea coast, so that it may justly be termed a littoral animal. On only two occasions, to my knowledge, has it been killed inland, and then at the eastern end of Slave Lake, close to or on the barren grounds; but on inspecting the two animals minutely, so close is their resemblance to one another, except in colour, that I am inclined, in default of more precise information, to class them as varieties of the same species, the blue being a rare one, and holding the same position that the silver does in the fulvous species. An examination of a number of skins would doubtless show shades of colour filling up the intermediate position that the cross fox holds to the other group.

Mustela Pennanti.—Legs, tail, belly and hinder part of back black, the back with an increasing proportion of grayish white to the head. Length over 2 feet. Vertebræ of tail exceeding 12 inches.

This animal is the pecan or fisher of the fur traders. In this district it is not found except in the vicinity of Fort Resolution, which may be considered as its northern limit. In the numerous deltas of the mouth of Slave River it is abundant, frequenting the large grassy marshes or prairies, for the purpose of catching mice, its principal food. In appearance it bears a strong family likeness to both the martin and the wolverine. Its general shape assimilates more to the former, but the head and ears have a greater similitude to those of the latter. It is named by the Chippewayan Indians "Thâ chô," or great martin. Its neck, legs and feet are stouter in proportion than those of the martin, and its claws much stronger. In colour and size it varies greatly. Young full-furred specimens, or those born the previous spring, can scarcely be distinguished from large martins, except by a darker pelage and a less full and more pointed tail. As it advances towards old age the colour of the fur grows lighter, the long hairs become coarser and the grayish markings are of greater extent and more conspicuous.

The largest fisher which I have seen was killed by myself on the Rivière de Argent, one of the channels of the mouth of the Slave

River, about fifteen miles from Fort Resolution; it was fully as long as a fulvous fox, much more muscular, and weighed eighteen pounds. In the colour of its fur the grayish tints preponderated, extending from half way down the back to the nose; the fur was comparatively coarse, though thick and full; the tail was long and pointed, and the whole shade of the pelage was very light and had rather a faded look; its claws were very strong and of brown colour; and, as if to mark its extreme old age, the teeth were a good deal worn and very much decayed. I caught it with difficulty: for about two weeks it had been infesting my marten road, tearing down the traps and devouring the baits; so, resolved to destroy it, I made a strong wooden trap: it climbed up this, entered from above, and ate the meat. A gun was next set, but with no better success; it cut the line, and ran off with the bone that was tied to the end of it. As a *dernier resort* I put a steel trap in the middle of the road, covered it carefully, and set a bait at some distance on each side: into this it tumbled. From the size of its foot-prints my impression all along was that it was a small wolverine that was annoying me, and I was surprised to find it to be a fisher. It showed good fight, hissed at me, much like an enraged cat, biting at the iron trap and snapping at my legs: a blow on the nose turned it over, when I completed its death by compressing the heart with my foot until it ceased to beat. The skin, when stretched for drying, was fully as large as a middle-sized otter, and very strong; in this respect resembling that of a wolverine.

In their habits the fishers resemble the martens; their food is much the same, but they do not seem to keep so generally in the woods. They are not so nocturnal in their wanderings as the foxes. An old fisher is nearly as great an infliction to a marten trapper as a wolverine. It is an exceedingly powerful animal for its size, and will tear down the wooden traps with ease: its regularity in visiting them is exemplary. In one quality it is, however, superior to the wolverine, which is that it leaves the sticks of the traps lying where they were planted, while the other beast, if it can discover nothing better to hide, will *câche* them some distance off. It prefers flesh meat to fish, is not very cunning, and is caught without difficulty in the steel trap. Fishers are caught by methods similar to those employed in fox-trapping.

Pine or American Marten (*Mustela americana*).—Legs and tail blackish; general colour a deep and rich orange-brown, clouded with black along the back. Head generally light-coloured, with the tips

of the ears and a stripe along the cheeks yellowish white. A broad orange patch is visible on the throat in some; in others this is nearly pure white, and in many entirely wanting. Sometimes, but rarely, the tip of the tail is white. Tail vertebræ about a third of the length of the body, often longer; its outstretched hind feet reach nearly to the end of the tail with the hairs.

The *Mustela americana*, as found in this district, is smaller than the fisher, but larger than the ermine weasels: in its shape it is less muscular, but more graceful than the former of these animals; its head is somewhat depressed, acute, and broader than might be looked for in so lengthened a skull; the ears are slightly pointed and covered densely on both sides with a short velvety fur, overlaid with coarser hairs; the legs are robust, rather short, and clad with a closer and stiffer hair than that on the body; the claws are about half an inch long, not very stout, but sharp, well curved and white in colour; the tail is considerably less than half the length of the body generally, though it is sometimes longer; it is well covered and tolerably bushy. The feet are comparatively large, densely covered with short woolly fur, mingled with stiffer hairs, which prevents the naked balls of the toes from being visible in winter, though they are distinctly so when the animal is in summer pelage.

The winter fur of this species is full and soft, about an inch and a half deep, with a number of coarse black hairs interspersed; the tail is densely covered with two kinds of hairs, similar to those on the back, but coarser; the hairs on the top are longest, measuring two inches and a half, and giving the end a very bushy appearance. The fur is in full coat from about the end of October until the beginning of May, according to locality; when in such a condition the cuticle is white, clean and very thin. From the latter of these dates the skin acquires a darker hue, which increases until the hair is renewed, and then gradually lightens until the approach of winter, the fur remaining good for some time before and after these changes. When casting its hair the animal has far from a pleasing appearance, as the under fur falls off, leaving a shabby covering of the long coarser hairs, which have then assumed a rusty tint. The tail changes later than any other part, and is still bushy in some miserable-looking summer specimens now lying before me. After the fall of these long hairs, and towards the end of summer, a fine and short fur pushes up; when in this state the pelage is very pretty, and bears a strong resemblance to a dark mink in its winter coat: it gradually lengthens and thickens as winter approaches, and may be considered prime after the first fall of snow.

It is difficult to describe the colour of the marten fur accurately. In a large heap of skins (upwards of fifty) which I have just examined minutely there exists a great variety of shades, darkening from the rarer of the yellowish white and bright orange into various shades of orange-brown, some of which are very dark. However, the general tint may with propriety be termed an orange-brown, considerably clouded with black on the back and belly, and exhibiting on the flanks and throat more of the orange tint. The legs and paws, as well as the top of the tail, are nearly pure black; the claws are white and sharp; the ears are invariably edged with a yellowish white, and the cheeks are generally of the same hue; the forehead is of a light brownish gray, darkening towards the nose, but in some specimens it is nearly as dark as the body. The yellowish markings under the throat (considered as a specific distinction of the pine martens) is in some well defined, and of an orange tint, while in others it is almost perfectly white; it also varies much in extent, reaching to the forehead on some occasions; at other times it consists merely of a few spots, while in a third of the specimens under consideration it is entirely wanting.

After minutely comparing these skins with Professor Baird's and Dr. Brandt's description of the martens, and the latter gentleman's paper on the sables, I find that the *Mustela americana* of this district agrees in general more closely with the latter, and am therefore disposed to coincide with that gentleman in his opinion that they are only varieties. The martens of this district bear a greater resemblance to the sables of Eastern Siberia than to the martens of Europe, holding, as it may with propriety be said, an intermediate position. I am also inclined to believe that the various colours found in these regions are simply varieties of the same species, and that the difference, if any, seen in the zib, are merely continental. In summer, when the long hairs have fallen off, the pelage of this animal is darker than in winter; the forehead changes greatly, becoming as deeply coloured as any other part of the body, which is of an exceedingly dark brown tint on the back, belly and legs; the yellow throat-markings are much more distinct at this season, but vary much both in colour and extent, though in only one summer skin are they absolutely wanting; the white edging on and around the ears still remains, but the cheeks assume a grayer tint; the tail is not so full, but from the high North latitude (the Arctic coast) from which these skins were procured, it is still rather bushy. One of the specimens has the dark hairs laid on in thin longitudinal stripes, causing a curious appearance.

Martens are found all over this district, except on the barren ground, to which, as they are arboreal animals, they do not resort; their dens are sometimes excavated, but more frequently are made in a tree. Their principal food is mice, and they are therefore abundant whenever these little creatures are plentiful.

The periodical disappearance of this species is very remarkable; it occurs in decades, or thereabouts, with wonderful regularity, and it is quite unknown what becomes of them: they are not found dead; the failure extends throughout the Hudson Bay territory at the same time; and there is no tract or region to which they can migrate where we have not posts, or into which our hunters have not penetrated.

Martens are caught commonly in wooden traps, baited with white-fish heads, pieces of flesh meat, or, still better, with the heads of wild fowl, which the natives gather for this purpose in the autumn. When they are at their lowest ebb in point of numbers they will scarcely bite at all: Providence appears thus to have implanted some instinct in them, by which the total destruction of their race is prevented. Martens are easily tamed, and look exceedingly pretty as pets. When enraged they utter a sound somewhat like the hissing of a domestic cat.

Common Mink (*Putorius Vison*).—Tail about half as long as the body. The winter colour varies, according to the age of the specimen, from a very dark blackish brown to a deep chesnut. Tail not bushy and very black. End of chin white. Length of head and body about 20 inches. Length of tail with hairs about 10 inches.

In shape the mink resembles an otter, as it also does in the colour and quality of its fur: in size it generally has about the same dimension as the *Mustela americana*. The colour of its pelt varies greatly; in winter its shades range from a dark chesnut to a rich brownish black. The tint of all the body is uniform, except that the belly is sensibly lighter, and that there is a series of white blotches running with greater or smaller breaks from the end of the chin to some distance below the fore legs, and again continued with more regularity from the middle of the belly to the anus; in some skins these markings are of small extent, but I have never seen them entirely wanting; there are commonly spots under either one or both of the fore legs, but not invariably. I have remarked that the coloration of this animal, as well as that of the otter and beaver, grows lighter as it advances in years, and that the white blotches or spots are of greater size and more distinctness in the old than in the young. The fur of a young mink,

under three years, when killed in season, is very handsome; its colour is often an almost pure black; the skin is thin and pliable, approaching nearly to the papery consistency of that of the marten. When aged the hide is thick and the colour more rusty; the summer pelage is short, but tolerably close, and is of a reddish brown colour, and the tail, though still possessing black hairs, shows distinctly the under fur of a decidedly rusty hue. Its feet are rather pointed, and not large; its legs are short, but muscular, and its track in the snow is easily distinguished from that of the marten, whose longer and well-covered paws do not sink so deeply; indeed, when the snow is at all deep and soft, the mink makes a regular furrow, similar to that made by an otter under like circumstances, though of course smaller. Its claws are white, and about half an inch long. The mink is easily tamed, and is exceedingly graceful in its movements. When it locates near a settlement, such as Red River, it is a dreadful destroyer of domestic poultry; in the wilderness it exercises this propensity on birds and water-fowl. It is almost omnivorous, being equally fond of fish and flesh.

The various methods of trapping this animal have been already detailed, and are similar to those employed in the capture of the marten. It is not difficult to catch in steel traps, though rather shy of wooden ones.

I am strongly inclined to the opinion that there is only one species of mink on this continent, and consider it highly probable that the *Putorius nigrescens* of Audubon and Bach is only the common mink under three years of age: I have seen numbers of skins here of exactly the same colour, size and furring as those described under that head in Prof. Baird's work on North American Mammals, which were simply young *P. Vison*. This gentleman also states that the American species of mink never has the edge of the upper lip white: I have never seen the whole of that part so coloured, but in one specimen now on my table there is a white spot beneath the nostrils.

Wolverine (*Gulo luscus*).—The winter colour dark brown along the back. A broad band of much lighter yellowish brown passes from the shoulder downwards along each side to the root of the tail. Forehead, cheeks and nape of the neck gray. A number of yellow, orange or white spots irregularly scattered from the throat to the fore leg. Feet and end of tail black.

The head of the wolverine bears, in colouring and in shape, a strong likeness to that of *Mustela Pemandi*. In general appearance and

movements it greatly resembles the *Ursus americanus*, as well as in the consistency and length of its fur; its walk, however, is not near so plantigrade as that of the latter animal, as is evident from an inspection of the soles of its feet, which are densely covered with hair. The head is broad and rounded, and the nose not so acute as in members of the genus *Mustela*; the eyes are small and far apart; the ears low and rounded, thickly covered on the outside with a long soft fur which nearly conceals them; the whiskers are comparatively short, stiff and not numerous; and there are over each eye sparse tufts of similar hairs.

The body is long and stout, of great muscular power, and formed more for strength than activity. The feet are larger in proportion than those of any other species of the subfamily *Martinæ*, and are armed with strong claws, well curved and more than an inch in length.

The skin which I propose now to describe is that of a female killed in last March: it is that of an average sized animal, whose coloration also is of the ordinary shades, and may be accepted with great propriety as a type of the species as found in this district. The pelage in winter is formed of a soft woolly under fur, tolerably fine and about an inch deep and overlaid by larger and coarser hairs, which are about three inches long on the rump, but shortening gradually towards the head, where they measure only half an inch. The feet are large and broad, the hind feet larger than the fore feet, and all densely covered with mingled fur and hair, about three-fourths of an inch in depth; the balls of the toes are naked, but from the thickness of the coverings of the feet they leave no impression upon the snow; by careful examination three additional small bare pads will be discovered on each foot; the nails are strong, sharp, well curved, white, and upwards of an inch in length, those of the fore feet being, if anything, the stronger, though there is little difference either in length or shortness. Comparatively speaking the tail is rather short, very bushy, particularly towards the end, which has the appearance of a piece cut off; the fur covering it is of the same kind as that on the body, but the under fur is not so thick, and there are more of the coarse hairs, which are here from five inches long at the root to six at the tip. The colour of the fur varies much, according to the season and age; the younger animals are invariably darker in the shadings than the old, which exhibit more of the gray markings. In the specimen under consideration the back from the nape of the neck to the rump is a dark blackish brown, perceptibly lighter on the neck and shoulders. From the fore leg a stripe of yellowish brown, about three inches broad, sweeps round each side,

and growing lighter as it proceeds, passes over the tops of the thighs and ends at the root of the tail, giving the back of the animal almost the appearance of an Esquimaux's tunic or shirt; and it is possible that these people may have borrowed their fashion from the wolverine, whose fur is greatly in request among them. The colours of the head are thus arranged: from the nose to between the eyes and around them the hair is very short, and is almost quite black; the forehead, ears, cheeks and nape are of a brownish gray shade, which gradually changes as it meets the darker tints and longer fur of the body; from the chin to the fore legs along the throat a black stripe of varied breadth extends, broken with large blotches of white or orange-yellow; the belly is of the same shade as the back until near the anus, where a spot of bright orange-yellow hairs extends to about four inches; the root half of the tail is light yellowish brown, and the top mostly black without any mixture of white hairs.

The legs and feet are black; there is a yellowish spot on the inner side of the fore legs about half way down, and the fur of the soles is of a light brown tint; the summer pelage is of a light colour, coarse and thin. In some specimens the yellowish fringing of the sides and rump is almost entirely white and of larger extent, leaving but a narrow stripe on the centre of the back dark: in such the hoary markings of the head would be of greater extent, and descend most probably to the shoulders.

In examining the skull of the wolverine the most striking points are the shortness and broadness of its muzzle and the roundness of the cranium, giving promise of a certain quantity of reasoning powers, which the nature and habits of this animal do certainly not belie. The entire structure is massive, the skull and bones are thick and ponderous, and the muscles of the neck and limbs of immense volume; indeed every requisite is apparently united to form a beast of extraordinary strength, and I do not wonder now at the almost fabulous feats, considering its size, that it has performed.

The habits and food of the wolverine are similar to those of the marten; it hunts birds, hares, mice, and will also occasionally kill disabled animals of the deer kind; but its greatest notoriety arises from the mischief which it does to the *câches* of meat and trapping roads, both of the natives and white residents. The strongest *câches*, built of green logs, and a foot in diameter and dove-tailed, it will manage to effect an entrance into: after satisfying its hunger it is not yet contented, but carries off the remainder of the pieces of meat, even those weighing upwards of 100 lbs., transporting them to some distance

and burying them in the snow. By following the animal's foot-prints those hidden stores can be recovered, but in general quite uneatable, as the wolverine, to protect its secret hoards from the attacks of other beasts of prey, besprinkles all his larder plentifully with his urine, which has a strong and most disagreeable odour, and proves a good preservative in most cases. But the desire for accumulating property seems so deeply implanted by nature in this animal that, like tame ravens, it does not appear to care much what it steals, so that it can exercise its favourite propensity to commit mischief. An instance occurred within my own knowledge in which a hunter and his family, having left their lodge unguarded during their absence, on their return found it completely gutted; the walls were there, but nothing else: blankets, guns, kettles, axes, cans, knives, and all the other paraphernalia of a trapper's tent, had vanished, and the tracks left by the beast showed who had been the thief. The family set to work, and by carefully following up all his paths recovered, with some trifling exceptions, the whole of the lost property. The damage which it does to a trapping road is very great; indeed, if the animal cannot be killed, it is as well to abandon it, as he will not only break the traps and eat the bait or animals caught, but also, out of sheer malice, will carry away the sticks and hide them at some distance. To kill or catch it is very difficult: an old stager is a regular bugbear to the Indians. "Master," said one to me in his own language, "I can't hunt furs; the wolverine eats the martens and baits, and smashes my traps; I put a steel trap for him, he got in, but released himself by screwing off the nuts confining the spring with his teeth. I set a gun; he cut the cord attached to the trigger, ate the bait, and broke the stock. What shall I do?" As the infallible strychnia had not then made its appearance in these parts I could offer him neither advice nor assistance, and but little consolation.

American Otter (*Lutra canadensis*).—Length about $4\frac{1}{2}$ feet. Muzzle longer than wide, sending down a naked point along the median line of the upper lips anteriorly. Under surfaces of the feet so covered with hair towards the circumference as completely to isolate the naked pads of the tips. A hairy strip extending forward from beneath the carpus on the palm. Colour above liver-brown, barely lighter beneath; inferior surface and sides of head dirty whitish.

In appearance the otter is a magnified mink: its walk, fur and colour bear strong similitudes to those of the latter animal, and the lightening of the tints of the pelage in old age is the same in both. Its fur is

short and thick, the under fur being of a silvery white shade, slightly waved and silky, and of similar texture to that of the beaver, but not so long. The colour of the overlying hairs varies from a rich and glossy brownish black to a dark chesnut. In summer the colour is a rusty brown and the fur is shorter and thinner. The habits of the otter are aquatic: from the shortness of its legs its motions on shore are not so quick as when in the water, and, as its food is principally fish, it resides in winter near some lake or river, where it keeps a hole open in the ice all the season: during this period of the year its migrations on land are toilsome, and it leaves a deep furrow or path in the snow, which, when seen by the trapper soon after the animal has passed, invariably leads to its destruction. If a trap be set on this road the otter is nearly certain to be caught, as it has a strong objection to opening new paths through the deep snow. In firing at an otter in the water care must be taken not to shoot it in an immediately vital part, as, if death ensues instantaneously, the body will sink like a stone.

Whether the *Lutra californica* be found in this district, or whether that animal be only a variety of the species under consideration, I cannot say; but an examination of a greater number of specimens will in time determine the matter.

White Thrushes.—My birds, which are snow-white, were hatched this year, in this immediate locality. The first nest, which was hatched the first week in April, contained four birds, one of them white, the other three of the usual brown colour. This white bird (a male) has now completed his moult. The second nest (hatched May 24th), had only three birds; all three are white. The third nest (hatched June 28th) had four birds, one of them white, two brown, and one brown with the tail and wing-feathers tinged with white. I am anxious to find out whether, if there have been any other white birds, they have turned out males or females. I believe mine are all males. During the severe thunderstorm we had some six weeks ago, two of the birds, which happened to be in a cottage, in cages near the window, were in some way affected with the lightning, one of them in a most extraordinary degree. Its nerves were evidently affected, and whenever the atmosphere was lowering it would sit down and gasp most violently, and its heart would be distinctly perceived throbbing. This occurred whenever rain was imminent, and then it might be caught without the slightest fluttering. So constant were these attacks, and so weakening to the bird, that I had it killed. Its beak also was twisted a little. The other bird was not affected to anything like its fellow. Its eyes were affected, and now, at times, the under lashes are a little distorted. During the same storm several bullfinches, canaries and nightingales, in the same cottage, were either affected in the same manner, or were killed at once.—*John Marshall; Belmont, Taunton, September 10, 1861.*

Destruction of Small Birds, &c.—When I stated (Zool. 7707) that the nightingale was becoming rare, or to use my precise words, “fast disappearing,” as a matter of course I was referring only to this county (Cambridge). I am delighted to find by Col. Newman’s communication (Zool. 7740) that this bird is gaining ground in localities where it was previously unknown. I hope to see similar records from other parts of the country. His paper recalls to my mind the sad and ruthless destruction of other tenants of the land and sea: I refer to the merciless shooting of various species of gulls, terns, phalaropes, &c., by sportsmen. Thousands in the course of every year are winged, broken-legged, or retire to some hidden nook to pine out, with horrible pain, their dying moments.—*S. P. Saville; Dover House, Cambridge, October 14.*

Occurrence of the Gray Phalarope (Phalaropus platyrhynchus) near Southampton.—Mr. J. Harrington kindly brought for my inspection a fine specimen of the gray phalarope, which he obtained from a man who had shot it at the mouth of the river Humber, near Southampton, on the 24th of September last. As is usually the case with this species, it was comparatively tame, allowing of a very near approach. Upon dissection I found its craw to contain a quantity of partly decomposed remains of a species of Hydrometridæ, probably *Velia rivulorum*, but they were in such a half-digested state that it was almost impossible to determine them. It had nearly completed its autumnal moult. Sex male.—*Id.*

Occurrence of Richardson’s Skua (Lestris Richardsoni) in Cambridgeshire.—The other day a man brought me a fine-marked immature Richardson’s skua, which he informed me had been taken in an exhausted state by a labourer at work in a field in Cottenham Fen, Cambridgeshire, on the previous afternoon (Sept. 16). It is in that state of plumage so admirably delineated in Yarrell’s ‘British Birds;’ if possible, this example presents more diversity of spots and markings than the figure in that work.—*Id.*

*Nesting of the Redtailed Tropic Bird: a Visit to Round Island.**—Round Island lies about twenty-five or thirty miles north-east of Mauritius, and is about a mile and a half long by a mile wide. The land rises at once from the sea to the height of about a thousand feet, and is consequently very steep. Here the redtailed tropic bird (*Phaëton rubricauda*, Bodd.) breeds in very large numbers. They are the tamest birds I ever saw, and do not know what fear is. They never attempt to leave their single egg or nestling at one’s approach, but merely stick out their feathers and scream, pecking at one’s legs with their beaks. It is the fashion on the island for visitors to remove the old bird from its egg by a slight shove, and then, placing the foot gently on its head, to draw out the long tail-feathers. It resents this insult by screaming and snapping, but never tries to escape by flying or shuffling along the ground; in fact, like all birds which have their legs placed so far behind, they cannot rise off a flat surface, but require a drop of a few feet to give them an impetus. One that had an unusually tight tail I lifted up and held in the air by that appendage, and it flapped in my hand until the feathers gave way, when it flew off, but having left a young one behind, returned almost to my feet in two minutes or so, as if nothing had happened. They do not appear at all particular in the choice of a place to deposit their single egg. They make no nest; but the shelter of an overhanging rock, or the protection of the arched roots of the *Vacoa* (a species of *Pandanus*), seems preferred. On one occasion I found an old lady asleep on her egg, and she was extremely indignant at being

* Reprinted from the ‘Ibis’ for April, 1861, and kindly communicated by the author.

stirred up and having her tail stolen. It is curious that I did not see a single egg without its owner sitting on it, and perhaps one may hence presume that they feed at night. In some places their nests were excessively numerous, their eggs or young occurring every few yards. There were to be found about as many young as eggs, some of the former almost as large as their mothers, and nearly able to fly; but I did not see a single immature bird that had started in life on its own account, though I have no doubt many had already done so. Most of the eggs had been incubated some time; in fact, on blowing fifty or so of them, I hardly think that I found half a dozen fresh, the majority being within a few days of hatching. I was rather short of baskets for carrying eggs, and consequently I did not get as many as I might have done. Certainly I had been told that the eggs might be picked up by the thousand, but I had not believed the statement. This species is much finer and larger than the yellowbilled one (*P. flavirostris*, Brandt.) Of this there were a few about the island; but I did not find a single egg, or see a bird on the ground. When on the wing, the fine rosy colour suffused over the whole under surface of the redtailed species comes out very well.—*Edward Newton.*

Occurrence of Chelonia caretta in Britain.—I had an opportunity of examining the turtle referred to by Mr. Edward (Zool. 7713) as having been got at Pennan, immediately on its arrival in Aberdeen, when it was in a very lively condition, and weighed 25 lbs., no great weight certainly for the species to which this individual belongs. It is the *Chelonia caretta*, not *C. imbricata*, and may therefore be considered an addition to our fauna, so far, at least, as mere stragglers can be considered such. This, with the two other species already described as having been found on our coasts, is described and figured in Cuvier's 'Règne Animal,' and may be easily recognised from its fifteen dorsal plates, serrated jaws, and heart-like outline. Dr. Dyce has fully described this individual in the 'Annals' for October, where there is also a notice of another specimen having been got on the banks of Loch Lomond,—a most extraordinary occurrence certainly, though we must not forget that it might have possibly made its way to this spot from the sea. It appears a very singular circumstance that no less than three turtles should have been procured all about the same time, and all probably of the same species; it would be somewhat difficult to suggest the likely cause of this, though this is a point of some interest and deserves investigation. I am somewhat disposed to believe that in some of the instances recorded by Fleming of the capture of *C. imbricata* this species (*C. caretta*) may have been intended.—*W. Sutherland; Aberdeen, October 7, 1861.*

Colias Edusa.—Whilst riding across Durdham Downs yesterday (September 24th) I saw what appeared to me to be a specimen of *Colias Edusa*. Although I have seen great numbers in clover and lucerne on the south coast in August, I am not aware of one being captured in this locality during an experience of more than twenty years. I therefore almost doubted my eyes, and determined, if possible, to become better acquainted with it. Not being provided with net or forceps, I had some difficulty in getting near, but eventually succeeded, whilst holding my horse with one hand, in securing my prize between the finger and thumb of the other. It proved to

be a fine female specimen of *Colias Edusa*.— *Andrew Lighton ; Clifton, near Bristol, September 25, 1861.*

Colias Edusa and Acherontia Atropos at Launceston, Cornwall.— On the 5th ult. I had a fine specimen of *Acherontia Atropos* brought me, captured in a room in this town. *Colias Edusa* has also made its appearance here: the first I saw on Sunday, the 18th of August, but within the last day or two my children have captured six specimens in fine condition, *viz.*, four males and two females. They also saw many more which escaped their nets.— *W. H. Hayward ; St. Thomas, Launceston, Cornwall, October 3, 1861.*

Description of the Larva of Eupithecia subfulvata.—Var. 1. Reddish brown. Central dorsal line pale olive, connecting a series of perfectly oval dusky olive blotches, which become confluent on the anterior and posterior segments. Subdorsal lines blackish, interrupted, dark opposite the dorsal blotches, pale and almost if not quite evanescent between them. Median dorsal blotches pale in the centre, very close together, almost confluent. Spiracular line white. Back thickly studded with minute white tubercles, and less thickly with whitish hairs. Belly whitish, with a purplish central line.

Var. 2. Ground colour pale yellowish brown. Markings similar to var. 1.

Feeds on leaves, flowers and seeds of *Achillea Millefolium*. In November, 1860, I took upwards of eighty larvæ on this plant in Bucks: some I sent to Mr. Hellins, the rest I kept myself. From June 21st to July 31st I bred about thirty moths, all true *E. subfulvata*. In two instances the bluish gray and red of the anterior wings was suffused in patches on the disk, but with this slight exception the thirty insects did not vary at all. I have, with some slight alterations, reproduced my description of the larva of *E. subfulvata* (*Zool.* 6817), thinking that it may facilitate a comparison of the distinctive characteristics of the two larvæ.— *H. Harpur Crewe ; The Rectory, Drayton-Beauchamp, Tring, August 30.*

Description of the Larva of Eupithecia succenturiata.—Var. 1. Dull dark reddish brown. Central dorsal line dingy black, connecting a chain of dull black, inverted kite-shaped blotches, which become confluent on the anterior and posterior segments. Subdorsal lines dusky, slender, waved, uninterrupted, darker between the dorsal blotches. Median dorsal blotches at some distance from each other, border generally pale, centre dusky. Spiracular line dirty white, interrupted. Head bordered by a reddish line. Belly dusky at the edges, pinkish white in the middle. Central ventral line blackish. Back and sides sprinkled with a few reddish hairs. General appearance dingy.

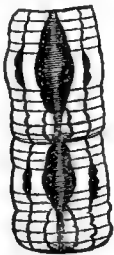
Var 2. Pale reddish brown. Central dorsal line and blotches dingy olive. Subdorsal lines dusky, very indistinct. In other respects resembling var. 1.

Var. 3. Ground colour dark, dingy olive. In other respects like var. 1.

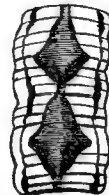
Pupa enclosed in an earthen cocoon, resembling in most points that of *E. subfulvata*. Some four years ago I met with this larva on the banks of the Stour, near Ipswich, Suffolk, feeding on leaflets of *Artemisia vulgaris*. I left the locality immediately afterwards, and, being unable to obtain a fresh supply of the food-plant, they all died. Last autumn my friend Mr. Hellins sent me some larvæ which he had taken on the same plant near Exeter, and I immediately recognized them as being the same as those I had previously found in Suffolk, and from these Exeter larvæ the foregoing descriptions were taken. I have now very great pleasure, at his request, in publishing them in the 'Zoologist,' and thus adding a link to the long chain of evidence by

which he has so satisfactorily proved that this species is entirely distinct from *E. subfulvata*.—*H. Harpur Crewe*.

Note on Eupithecia succenturiata and E. subfulvata.—Last autumn, in a locality where *E. succenturiata* had been previously taken in the imago, I beat from mugwort (*Artemisia vulgaris*) a number of pug larvæ. Several of these were plainly *E. absinthiata*, but the greater number reminded me at once of the larvæ of *E. subfulvata*, which I had reared from the egg a season or two before. Having no notes or figure to refer to, I could not myself decide how far the resemblance extended, or where it failed; but on my sending some of these mugwort larvæ to Mr. Buckler, who I knew had figured *E. subfulvata*, he at once wrote to say that he had compared them with his figures (life size and magnified), and found them decidedly distinct. This announcement caused me to send batches of them to others of my friends, including Mr. Doubleday, Mr. Crewe, Mr. D'Orville, and Mr. Batty of Sheffield, and at the



Eupithecia subfulvata.



Eupithecia succenturiata.

same time set me collecting, for comparison, all the pug larvæ I could find in my own neighbourhood feeding on yarrow (*Achillea Millefolium*): some yarrow-feeders were also sent me by Mr. Crewe and Mr. Batty, and all these (though found in three such distant localities as Exeter, Sheffield and Drayton-Beauchamp, and varying somewhat among themselves) could be distinguished from the mugwort-feeders, both by their colour, and the form of their markings. Our hopes therefore of breeding *E. succenturiata* rose high; nor have they been disappointed: this summer, in June and July, myself and friends have bred from the mugwort larvæ upwards of thirty moths, which, with ten others bred by Mr. Norcombe, who collected the larvæ for himself, make a total of more than forty, every one of which was the typical *E. succenturiata*, having the central space of the wings white; whilst from the yarrow-feeders we have bred some eighty moths, every one of them *E. subfulvata*, brown and gray without any white. From mugwort more than forty *E. succenturiata*, and not one *E. subfulvata* or *E. cognata*; from yarrow eighty *E. subfulvata*, and not a single typical *E. succenturiata*. Both species vary indeed in the colour of the dark border of all the wings. I bred both of them with reddish brown borders, instead of the more usual blackish gray, but in every case the colour of the central space (except of course where traversed by strigæ) was a beautiful pure white in *E. succenturiata*, and in *E. subfulvata* brown or brown and gray. When to all this I add that their cages were kept side by side, and treated precisely in the same way (nearly all the specimens of *E. succenturiata* had emerged before *E. subfulvata* began to appear) I think the evidence in favour of their being distinct species, and not merely varieties of the same, is tolerably conclusive. Mr. Doubleday I know regards it so, and I understand that M. Guenée agrees with him.—*J. Hellins; Exeter, September 16, 1861.*

*Description of a Geometer probably hitherto uncharacterized.—*EPHYRA ? DECORARIA, *Newman.*

About the size of *Ephyra porata*. Fore wings with the costal and hind margins bluish lead-colour; disk of the wing tinged with delicate red, inclining to rosy: two very distinct pale gray transverse waved lines, one of them short and situated at one-fourth of the distance between the base of the wing and its hind margin, the other twice the length of the first and situated at three-fourths of the distance between the base and hind margin: near the centre of the wing, but nearer the costal than the inner margin, and exactly intermediate between the two transverse lines I have described, is a conspicuous white spot transversely elongate. Hind wings nearly the same colour as the margins of the fore wings and almost without any tinge of red, and having two transverse waved lines and a central white spot, nearly corresponding in character and position with those on the fore wings; cilia pale gray, corresponding in colour with the transverse lines. Antennæ setaceous. Head, thorax and body gray lead-coloured. For the loan of this exquisitely beautiful moth I am indebted to Mr. Shrobbree, who bred it in June last, from a larva which he found in May, feeding on the bedeguar of a wild rose: he describes the larva as green, with a purplish median stripe down the back. I am induced to give this moth a name from a knowledge of the readiness with which experienced entomologists will kindly point out a previous description when a species has been redescribed in error, although innate modesty might have prevented their giving an opinion when the same insect was submitted to their examination. This species, I may hint, is somewhat like the *Phalæna albicinctata* of Haworth, whose description will do pretty well as regards the markings, but the colour is totally different. "*Alis nigris, singulis puncto medio, strigaeque juxta marginem posticum communi albis.*" The specimen is described by Haworth as being in the late Mr. Hatchett's collection, which subsequently came into the possession of Mr. Ingall.—*Edward Newman.*

Description of the Larva of Semyra venosa.—Head scarcely so broad as the body; body of uniform breadth, warty, hairy, but without humps. Head shining black, having a whitish spot just above the mouth, and a conspicuous pale yellow V-shaped mark on the face, the apex of the V pointing towards the epicranium; the cheeks are also adorned with paler markings: ground colour of the body velvety black, each side having two parti-coloured longitudinal stripes; of these the upper or subdorsal stripe is composed of a series of amorphous blotches or markings, alternately white and orange-coloured, the whiter markings occupying the junctions of the segments, the orange markings occurring between them; the lower stripe on each side occupies the spiracular region, and includes the spiracles; like the upper stripe it is irregular, interrupted, and composed of the same colours, white however predominating; in these stripes are seated the warts, mostly orange-coloured, and each emitting a sparse fascicle of black and white bristles; on the second segment is a fringe of bristles of various length and colour, projected over the head: belly whitish gray; legs blackish at the base, flesh-coloured towards the tip, each having one black terminal claw; claspers flesh-coloured. For a specimen of this beautiful larva I am indebted to Mr. Brown, of Cambridge. It feeds on *Cladium Mariscus*, *Arundo Phragmites*, and several of the coarser grasses. When full fed it cuts a number of the smaller blades of the grasses on which it happens to be feeding, into lengths of an inch or an inch and a quarter, and then spinning a cocoon, generally between two principal stems

of the grass or reed, although *sometimes* attached only to one, it covers or thatches its habitation with the smaller pieces, leaving no part of its silken shroud visible: this thatched domicile is rather smaller at both ends, or shuttle-shaped, and is suspended perpendicularly: in this it passes the winter, and the perfect insect emerges the following June. These larvæ are peculiarly liable to parasites, both dipterous and hymenopterous; the dipterous is a large species of *Tachina*, allied to *T. nigripes*, but I think hitherto undescribed. In our present very imperfect knowledge of the affinities of *Lepidoptera*, now being for the first time investigated in France by M. Guenée, it is extremely difficult to assign to *Semyra* its natural position: Guenée places it at the end of the *Bombycoïdæ* and immediately before the *Leucanidæ*. The larva of *S. venosa* appears to have greater similarity to the *Ursinæ* than to those of the *Bombycoïdæ*, and the French lepidopterist himself observes that "the young larvæ may easily be confounded with those of *Arctia*." The wings of the imago are strongly lined, like those of *Leucania pallens*, in a longitudinal direction.—*Edward Newman*.

Capture of Noctua ditrapezium near Portsmouth.—This rare species was taken, in the early part of the summer, near Portsmouth, by my brother, the Rev. H. Matthews, and also by a friend of his in the same locality.—*A. Matthews; Gumley, Market Harborough, October 21, 1861*.

Second capture of Margarodes unionalis near Torquay.—On Saturday, the 5th of October, I took a specimen of *Margarodes unionalis* not far from the spot where I imagine Mr. King took his, two years ago. Mr. Terry, another collector here, was with me when I took it. It is in very fine condition, and answers exactly with the figure in the 'Annual' for 1860.—*R. M. Stewart; 3, Park Place, Torquay, Devon, October 8, 1861*.

Captures of Lepidoptera near Dublin.—As I expect to leave Dublin in a few days, I forward a few notes of my most remarkable captures in the neighbourhood during the last season:—

Lithosia caniola. This species occurred sparingly in sheltered spots on the coast in the middle of August: it was over in fourteen days from the appearance of the first specimen. It flies gently at early dusk, and is partial to the flowers of ragwort and *Galium verum*. A female laid a lot of eggs, and the larvæ are feeding in the cages of a friend, but, as they evidently hibernate, grave fears are entertained that they will not survive the winter.

Agrotis obelisca. This species is not rare here, frequenting ragwort bloom in August and the beginning of September. It is singular that, as far as I know, this is its only intermediate locality between Edinburgh and the south coast.

Agrotis agathina. I have at last discovered this lovely species in Ireland: a few specimens occurred at heath bloom, on the coast, in the beginning of September.

Dianthœcia capsophila. This species occurred again in June, both at light and hovering at flowers, on the cliffs, but only in small numbers: it appears to be scarce even in its very restricted localities. I looked for the larva among *Silene maritima* and found some, different from all our known species, which would probably produce it, but they were so tender that only one or two have entered the pupa state, so that the chance of rearing it is diminished considerably. Singularly enough, I also found larvæ of *Dianthœcia Cucubali*, a species not before known to occur in Ireland: they fed up well enough.

Peronea permutana and *P. aspersana*. These local species were not rare among plants of *Rosa spinosissima*, on the coast, in August.

Sericoris littorana. I was surprised at the appearance of a second brood of this species in September, all of the true Irish type, light ground-colour, with rich dark markings, and some finer than any of the summer brood.

Dicrorampha consortana. Scarce, in August, on a little spot of limestone soil on the coast, the exact spot where *D. acuminatana* and *D. senectana* occur.

Eupœcilia dubitana. Excessively local on the cliffs in June; generally hiding among furze.

Eupœcilia atricapitana. Widely distributed along the coast, occurring both on cliffs and sand-hills, and lasting from the middle of June to the middle of August, but rare. I never saw more than one specimen in a day.

Tinea confusella. Rambling along the cliffs on the coast, in August, I noticed a little *Tinea*, pretty common, sitting about and running up the grass stems like an *Elachista*. This has been identified by Mr. Stainton as *Tinea confusella* of Herrich-Schæffer, new to Britain and rare on the Continent, and occurring on rocks near Vienna.

Plutella annulatella. This species abounds under the cliffs close to the sea, but larger and much more richly marked than English specimens. Singularly enough I took the English form on sand-hills at only a few miles distance.

Depressaria capreolella. A few specimens have occurred on the coast. In August they come occasionally to ragwort bloom at dusk; in April, after hybernation, they fly in the afternoon over furze bushes.

Depressaria nanatella and *D. rotundella*. These two species occur together not uncommonly along the coast, in August and September. They are fond of the flowers of ragwort, thyme and *Galium verum*.

Gelechia vicinella. Scarce among *Silene maritima* on the coast, at the end of August.

Gelechia leucomelanella. This species, which has, I believe, hitherto only been taken at the Lizard, in Cornwall, also occurs among *Silene maritima*. It appears to be not nearly so active as most of the *Gelechiæ*, and generally falls down when beaten from its concealment, and allows itself to be captured.

Gelechia coronillella. This inhabitant of the "hilly field" at Headley Lane has turned up here on the limestone upon the coast, in August.

Gelechia Tarquiniella. This little gem, new to Science, and indebted to Mr. Stainton for a name, has habits similar to those of *G. pictella*, which it resembles. It occurs on the sand-hills, in warm hollows among moss, *Galium*, &c., in June, and cannot well be seen, much less captured, without lying down, when it is only to be secured by sharp practice with a pill-box.

Cœcogenia Kindermanniella. This species is said, in the 'Manual,' to occur in houses: I beat it out of furze-bushes in August, in company with *Depressaria costosa* and *Gelechia instabilella*.

Coleophora olivaceella. I took a few specimens flying on the cliffs in the evening, at the end of July.

Oinophila V-flava was very common in June, in damp warehouses where the walls were covered with thick mould and fungus. — *C. G. Barrett*; 30, Parkgate Street, Dublin, September 29, 1861.

Description of a Tortrix new to Science.—

EUPŒCILIA ALBICAPITANA, Cooke.

Head, face and palpi white. Antennæ gray. Anterior wings white, with a dark gray spot near the middle of the costa, a smaller one between that and the base of the

wing, and a still smaller one at the apex; opposite the middle spot is another dark gray spot on the inner margin, extending across the wing, nearly joining the one on the costa, the space between the spots being speckled with dark gray, so as apparently to form a dark gray band across the wing, broadest on the inner margin. A light drab-coloured striga, dark gray on the costa, runs from near the apex to the anal angle, and between it and the middle of the wing is an oval spot of the same colour. Cilia white, speckled with dark gray. Posterior wings dusky. Expanse of wings eight lines. I captured this insect on the Hill of Howth, about the 20th of June, 1857, and felt convinced at the time that it was undescribed, but did not think it desirable to name it until more specimens had been taken. Since then I have ascertained that some specimens have been taken on the Cheshire coast, both by Mr. Gregson and Mr. Greening; and this season it has been taken in the same locality where I found it four years since. It is more like *E. dubitana* than any other species, but is sharper-winged, larger and lighter-coloured, especially near the apex of the wing.—*Nicholas Cooke*. [Read before the Northern Entomological Society.]

Notes on a Species of Lithocolletis bred from Cherry-leaves.—In the middle of September I found, in a garden at Exeter, several mines of a *Lithocolletis* in the leaves of a *Morella* cherry tree trained against a wall. These travelled about with me for about ten days, and a few days after my arrival at home two perfect insects made their appearance,—a rather unusual occurrence, as at that time most of the second brood of *Lithocolletis* larvæ should have been feeding. Now, according to the views entertained by some entomologists, and chiefly by one gentleman of high standing in the science, these should be *L. cerasicolella*, a species that has not yet been found in this country, and which on the Continent mines in *Prunus Padus*, and belongs to a section of the genus, the species of which mostly affect trees or shrubs of the order Rosaceæ. But the insects are not *L. cerasicolella*; they are in fact *L. torminella*, typical and unchanged in any way; and this I consider as additional proof of the stability of the latter as a species. *L. torminella* feeds naturally on *Sorbus torminalis*, and as this shrub is closely allied to the wild apple, and as the insect is also closely allied to *L. pomifoliella*, which feeds on the latter tree, here is a good opportunity for testing the theory that difference of food may cause differences in the perfect insects, so great as to cause some entomologists to consider them distinct species; but that food does cause such differences is, I think, clearly disproved in the present instance. *Pyrus Malus* is more closely allied to *Sorbus (Pyrus) torminalis* than is *Morella* cherry to the latter species; and so, allowing that food may cause variation, the perfect insects from the cherry should have been more distinct from *L. torminella* than that species is from *L. pomifoliella*, and perhaps should have been *L. cerasicolella*. The result I think shows the fallacy of the theory. I have before promulgated my views on this subject, and pen these remarks in no party spirit; but the facts here referred to appeared to have so strong a bearing on the matter that I could not resist recording them.—*R. M'Lachlan*; 1, Park Road Terrace, Forest Hill, October 10, 1861.

Pupa of a Limnobia enclosed in a Jelly-like Substance.—In a pond near Rainhill I lately found the pupa of a Dipterous insect, enclosed in a wrapper of jelly, so pellucid that when transferred to a glass of pure water it was scarcely visible. The jelly was five or six times the thickness of the enclosed pupa, and quite firm. In a few days the transformation took place, and the insect proved to be a *Limnobia*; I am not certain of what species.—*Henry H. Higgins*.

Economy of Cecidomyia Taxi.—When I was in Surrey, in January last, I noticed that the yews that grow intermingled with junipers on Riddlesdown, near Croydon, were covered here and there with tinted bosses, which had a very pretty appearance. I gathered several, in the hope that I might be able to find out the insects that had been instrumental in forming these artichoke-like galls. The galls I kept in my botany-case for many weeks, but unfortunately the larva died in its nidus of leaves, and I was thus disappointed. More recently, however, I observed the same bosses on yew trees in Yorkshire, and as May was nearly over I thought it not unlikely I might succeed better at a season when so many of the *Cecidomyiæ* make their entrance into life. I gathered a handful of affected shoots, put them into a cup of water, and covered them over with a bell-glass. This time I was rewarded for my perseverance. The first day of June I had the pleasure of seeing two gall-gnats (male and female), under the glass, and others have since appeared. The gall, as I have said, is in form not unlike a tiny artichoke, in the heart of which a single larva lives through the winter in its nest of closely-fitting leaves, which diminish in size as they approach the centre. The gnat lays her egg in June, in the young and tender green shoots which are just then beginning to grow; these become crippled, and gradually assume the appearance I have described, offering food and shelter to the yellow-coloured larva during the winter months. In April or May it enters on the pupa stage of its existence, gathering intensity of colour as it approaches maturity, and in June it comes forth in the winged condition, a beautiful orange-coloured fly. For the benefit of those who may be more particularly interested in the Diptera, it may be well to describe more minutely the perfect insect, inasmuch as Professor Loew, though alluding to the artichoke galls at the end of the branches of *Taxus baccata*, says that the fly is still altogether unknown (*noch ganz ungewiss ist*), nor does Mr. Walker include the species among the 200 *Cecidomyias* he describes with such minuteness. I may just remark that the yew gall-gnat presents a tolerable appearance, being nearly equal in size to the well-known *C. rosaria*.

CECIDOMYIA TAXI, *Inchbald*.

Male. Antennæ apparently shorter than in the female, from the greater crowding of the joints, which are verticillate, pilose. Thorax testaceous, darker laterally, with a spot in front and two dark triangular spots behind. Abdomen orange, with dusky pile, forcpated. Legs darker in the upper half, paler in the lower.

Female. Antennæ testaceous as in the male, eighteen-jointed; joints petiolated, less densely pilose. Thorax as in the male. Wings ashy, with dusky pile in both sexes. Transverse veinlet somewhat beyond the middle of the subcostal vein. Abdomen orange, with paler oviduct. Legs dark, with gray pubescence.—*Peter Inchbald; Storthes Hall, near Huddersfield, September 2, 1861.*

[I am indebted to my kind correspondent for a series of specimens of this beautiful and interesting gall.—*E. N.*]

Capture of Ptinella gracilis in England.—I believe I may announce the occurrence of this very pretty little insect in England. Of the six species of *Ptinella* figured by Gillmeister, *P. gracilis* was the only one which we have hitherto failed to detect in this country. In August last I captured an extremely small-winged *Ptinella*, answering well to Gillmeister's figure of *P. gracilis* in size and shape; and although I have not yet had the opportunity of examining it thoroughly, I feel no doubt as to its identity with the species in question.—*A. Matthews; Gumley, Market Harborough, October 21, 1861.*

Phosphorescent Light produced by Nebria brevicollis.—One very dark and warm night, in the early part of the present month (October), I observed a considerable quantity of some brightly luminous matter on a gravel path in my garden. On a closer inspection I found that this consisted of many small detached patches, among which some animal was moving at a rapid pace, carrying with him a large quantity of the same luminous matter, and every now and then depositing a fresh patch. My curiosity was much excited by such a remarkable proceeding, and leaving Mrs. Matthews, who was with me, to watch the spot, I procured a light as quickly as possible, and discovered, to my surprise, that all this illumination had been the work of a *Nebria brevicollis*, who was literally detected *flagrante delicto*. I have often before this seen a strong phosphorescent light produced by various species, such as worms, centipedes, and the small white animals allied I believe to the Oniscidæ, so common in decaying vegetable substances; but this is the first instance I have met with of a coleopterous insect depositing any luminous matter on the ground. In all the cases of luminous deposit by worms, centipedes, &c., which I have had the means of examining, the animals had been recently injured, and the fluid oozing from the wound produced the luminous appearance. The *Nebria*, on the contrary, was perfectly sound, and seemed to be in a high state of pleasurable excitement. I can form no conjecture as to the cause of its proceedings, unless the light was intended for a sexual signal.—*A. Matthews.*

Eccentricities of Genius.—A Catalogue of European Lepidoptera, now in the press, which promises to be a most useful one, will shortly be published; it is from the pens of Dr. Staudinger and Dr. Wocke: in it will be found enumerated, with synonyms, 392 Rhopalocera, 179 Sphinges, 318 Bombyces, 975 Noctuæ, 719 Geometræ, &c. The Bombyces are headed by *Sarothripa revayana*, *Earias vernana*, *E. clorana*, *Hylophila prasinana*, *H. quercana*, and the genus *Nola*, and conclude with two genera which have hitherto been placed amongst the Noctuæ, *viz.* *Thyatira* and *Cymatophora*. The Noctuæ begin with *Diloba cæruleocephala*, and include *Demas Coryli*, *Asteroscopus nubeculosa*, *A. Cassinea*, *Aventia flexula*, *Boletobia fuliginosa*, and the group of *Deltoides*.—*H. T. Stainton, in 'Intelligencer,' September 7, 1861.*

List of Trichoptera and Neuroptera captured near London in 1861.

By PERCY C. WORMALD, Esq.

THE following is a list of the Trichoptera and Neuroptera, which I have captured this year, in the neighbourhood of London:—

Phryganea grandis. Willesden and Hampstead; June.

P. varia. One specimen, Ruislip, Middlesex; August 24.

Glyphotælius pellucidus. West Wickham; May.

Colpotaulius incisus. Two specimens, Willesden; August 31 and September 9.

Limnephilus nitidus. One specimen, Hammersmith Marshes; June 13.

- L. vitratus*. Willesden, Kingsbury and Ruislip; August.
- L. rhombicus*. Willesden and Kingsbury; common, July and August.
- L. marmoratus*. Willesden, near Kew, &c.; August.
- L. vittatus*. West Wickham and Ruislip; July and August.
- L. centralis*. Hampstead, Epping Forest and Ruislip; June, August.
- L. hirsutus*, *Kolen*. Willesden; July and beginning of August.
- L. fumigatus*. Two specimens, Willesden; July 31 and August 31.
- Anabolia nervosa*. Willesden; very abundant, August to October.
- Stenophylax concentricus*, *Kolen*. Two specimens, Willesden; October 3.
- S. lateralis*. Three specimens, Kilburn; June.
- Hallesus digitatus*. Willesden; common, October 3.
- Goëra capillata*. Willesden and Kingsbury; August.
- G. fuscicornis*. Willesden and Kingsbury; common, August.
- Molanna angustata*. Willesden and Kingsbury; July and August.
- Leptocerus grossus*, *Steph.* Two specimens, Ruislip; August 24.
- L. fulvus*, *Ramb.* Ruislip; August. This species is new to Britain.
- L. cinereus*, *Curt.* Kingsbury, Willesden, Lewisham, and the banks of the Thames; common, August.
- L. dissimilis*. One specimen, Willesden; July 29.
- L. aterrimus*, *Steph.* Hampstead, &c.; June.
- L. bicolor*. Ruislip, Willesden, and the banks of the Thames; August.
- L. pilosus*. Hyde Park; common, June to August; also at Kingsbury, Ruislip and Willesden.
- Mystacides atra*, *Pict.* Willesden, &c.; common, August and beginning of September. I observed this species flying at noon in hot sunshine.
- Setodes conspersa*. One specimen, Hyde Park; July 15.
- S. lacustris*, *Pict.*? Willesden and Kingsbury; August and beginning of September.
- Agapetus funereus*. Willesden; August.
- Polycentropus concinnus*. Willesden; common, July and August.
- P. bimaculatus*. Kingsbury and Willesden; July to September.
- Tinodes pallescens*. Kingsbury and Lewisham; August.
- Psychomia pusilla*. Banks of the Thames; very abundant, August.
- Hydropsyche fulvipes*. Kingsbury and Lewisham; very common, August. It appears to fly soon after noon and a little before sunset.
- Besides these I have taken several other species (principally of *Polycentropus*), at present undetermined.

Most of the above have been obtained by sweeping with a net along the margins of streams, &c. The most productive time is about sunset and for an hour after; but I have taken some species (*Hydropsychidæ*, &c.) in this way at all times of the day.

Chrysopa flava. One specimen, beaten from an oak at West Wickham; August 26.

C. 7-punctata. One specimen, Kilburn; August 15.

Sisyra fuscata. Willesden, &c.; July and August.

S. terminalis. Beaten from trees on the banks of the Thames between Kew and Richmond, August 27. This species had, I believe, been previously taken only at the Lakes of Killarney, Ireland, by Mr. Curtis.

Hemerobius Humuli. Kilburn, Hampstead, &c.; very common.

H. micans. West Wickham; by beating fir trees; August.

H. nervosus. Kilburn and Hampstead; common on fences, &c.; July.

H. phaleratus. West Wickham, by beating fir trees; August.

Psocus bifasciatus, *Curt.*? One specimen, West Wickham; August 7.

Cloëon diptera, *L.* Hampstead; August 3.

PERCY C. WORMALD.

10, Priory Road, Kilburn,
October 24, 1861.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

October 7, 1861.—JOHN LUBBOCK, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘Transactions of the Zoological Society of London, Vol. iv. Part 7; ‘The Proceedings of the Scientific Meetings of the Zoological Society of London, 1861,’ Part ii.; presented by the Society. ‘Proceedings of the Literary and Philosophical Society of Liverpool, during the Fifteenth Session, 1860-61,’ No. xv.; by the Society. ‘Proceedings of the Royal Society,’ No. 45; by the Society. ‘The Zoologist’ for October; by the Editor. ‘Descripçao de dois Insectos Coleopteros nas Costas orientaes do Oceano Indico, pelo Barao do Castello de Paiva, Professor de Botanico na Academia Polytechnica do Porto;’ by the Author. ‘Smithsonian Contributions to Knowledge,’ Vol. xii.; by the Smithsonian Institution. ‘The Journal of the Society of Arts’ for September; by the Society. ‘The Athenæum’ for August; by the Editor. ‘Sitzungsberichte der Königl. bayer. Akademie der Wissenschaften zu München;’ by the Academy. ‘The Entomologist’s Weekly Intelligencer,’ Nos. 257—260; by H. T. Stainton, Esq.

Election of a Member.

James Rome, Esq., M.A., &c., Woodlands, Hamilton, Lanarkshire, was elected a Member of the Society.

Exhibitions.

Mr. Pascoe exhibited a number of Coleoptera, selected from a large collection (about 1300 species) which he had made, during the preceding winter, in the South of France (Dep. du Var). One of these, the true *Carabus vagans*, is not found in the mountains, as M. Léon Fairmaire has stated in his 'Faune Française,' but in the low-lying ground near the sea, especially delighting to hide under the large leaves of the artichoke, in which situation it is often found in considerable quantities. An *Anophthalmus* (*A. Raymondi*, one of the numerous discoveries of that most indefatigable naturalist, M. Raymond), is found very sparingly in a small limestone cavern near Hyères: it is well worthy of note that the same species has been taken in the cellar of an old monastery at Marseilles: like all the blind beetles it runs very rapidly, and can only be taken with difficulty. Another recent discovery of M. Raymond's, *Anillus Gallicus*, *Aubé*, also blind, is only found beneath very large stones deeply embedded in the earth. *Amaurops Aubei*, one of the *Pselaphidæ*, and blind also, as its name implies, is found, but very rarely, beneath the bark of old pine-stumps (*Pinus halepensis*). *Faronus Lafertii*, a very remarkable *Pselaphidean*, resembling a *Staphylinus*, was not unfrequently found at the roots of grass, often associated with *Thorectus grandicollis*, *Germ.*, and *Trotoma pubescens*, *Kiesw.*, the latter sometimes in considerable numbers. Two insects belonging to families which in England are mostly found on flowers, *Atelestus hemipterus*, *Er.*, and *Anthicus Genei*, *Laf.*, may often be seen during the month of May running rapidly over stones on the coast within a few inches of the sea.

Mr. Pascoe also called especial attention to the fine, and until recently excessively rare, lamellicorn *Callienemis Latreillei*, *Lap.*: this insect, he stated, was only to be found a very short time during the month of May, appearing for a few minutes on the sands at St. Raphael, just as the dusk was deepening into night; they disappeared immediately at the approach of a light, burying themselves in the loose sand from which they had just emerged: they only came out when the night was perfectly calm, and it was singular that while at Hyères they were only seen on the wing at St. Raphael they invariably confined themselves, as M. Raymond informed him (Mr. Pascoe), to crawling on the sand. Among the specimens which Mr. Pascoe exhibited were *Antidipnis rubripes*, *Perris*, found in the sand at the root of an *Artemisia*, and *A. Javeti*, *du Val*, from which it is perfectly distinct; *Ptilium filiforme*, a new species named but not yet described by Dr. Aubé, first found by M. Raymond in sand close to the sea; *Theca byrrhoides*, *Aubé*, a new genus allied to *Dorcatoma*, a single specimen of which he (Mr. Pascoe) had taken at St. Raphael; *Chærorhinus squalidus*, *L. Fairm.*; *Auletes cisticola*, *L. Fairm.*; *Julodis Onopordi*, *Fab.* (from Toulon); *Lema Hoffmannseggi*, *Lac.*, and *Ceutorhynchus Raphaeleusis*, *Chev.*; the latter, originally discovered by M. Raymond at St. Raphael, on young plants of the *Glaucium luteum*, and by carefully turning back the leaves of the unexpanded bud Mr. Pascoe stated he invariably found one or more individuals on every plant which he examined at Hyères. *Glaucium luteum*, or yellow horned poppy, abounds on many of our shores, and as this *Ceutorhynchus* has been recently found on the same plant at Paris, it is not unlikely that it may be added to our Fauna; the south coast of the Isle of Wight would seem to offer a very favourable locality.

Mr. Miller exhibited a small and beautiful moth of the family Geometrina, said to have been bred from a larva found in the vicinity of London, which fed on the exterior of the bedeguar, or mossy gall of the rose; it had been examined by Messrs. Doubleday and Newman, and considered by them as a species not yet known as an inhabitant of Britain.

Mr. Shepherd believed this insect would prove to be an extraordinary variety of *Ephyra pendularia*.

Messrs. F. Bond and S. Stevens were of the same opinion.

Professor Westwood remarked that at the meeting of the Society on the 4th of February last, Mr. Smith had sent for exhibition what were considered to be small pupa cases found attached to wasps' nests by Mr. Stone; he was now enabled to state that they were the eggs of the dipterous genus *Volucella*, well known to be parasitic in wasps' nests, Mr. Stone having forwarded to him the larvæ produced from them, which were undoubtedly those of *Volucella*. Professor Westwood exhibited the larva, which he observed was well figured by DeGeer, 'Histoire des Insectes,' Vol. vi. plate 3. Professor Westwood had also been informed by Mr. Stone that he had found *Anthomyia incana* to be parasitic in wasps' nests; and the same accurate observer had detected the larva of *Ilythia sociella* in a nest of *Bombus sylvestris*; the cocoons of this moth had been frequently found in the vicinity of humble bees' nests, but he (Professor W.) had not previously heard of the larva having been actually discovered in the nests.

Professor Westwood also observed that he had, at the meeting of the Society on the 2nd of August, 1858, exhibited a mutilated Strepsipterous insect, sent to the late Mr. Spence by Herr Neitner, of Ceylon, who had found the specimen issuing from the body of a *Formica* found in that island. Professor Westwood had at the same time read a description of the insect, and published figures in the 'Transactions,' forming for its reception the genus *Myrmecolax*. He had lately received from Herr Neitner an ant having one of these parasites protruding from the end of the abdomen; this he had had the pleasure of extracting, and exhibited it to the Meeting; he also found the head-cap of the pupa of a second specimen, proving that there had been two of the parasites within the ant. Professor Westwood added that he was now enabled to state, from the examination of this perfect example of the *Stylops*, that the figures and description he had published, from the damaged insect received in 1858, were on the whole tolerably accurate. He called especial attention to the remarkably large antennæ of this insect, exceeding those of any other genus of Strepsiptera.

Dr. Wallace read a list of rare or reputed British Lepidoptera which he had lately seen in a collection formed by a farmer in Suffolk; it included *Papilio Podalirius* (said to have been captured near Seven Oaks, Kent), *Parnassius Apollo* (said to have been taken in the Forest of Dean), and many other species of extremely rare or doubtful occurrence in Britain.

Dr. Knaggs exhibited living larvæ of the following species of *Eupithecia*, received from the Rev. Joseph Hellins, of Exeter, viz.:—*E. tripunctata*, *E. expallidata*, *E. virgaureata*, *E. subfulvata* and *E. succenturiata*. Dr. Knaggs pointed out the differences in the larvæ of the two last-named insects, which are by some entomologists considered to be varieties of one inconstant species: he stated that Mr. Hellins had noticed the larva of *E. succenturiata*, which feeds on mugwort, preferring the seeds, to be infested by an hymenopterous parasite, the larva of which, when full fed, eats its way out of the caterpillar and constructs a cocoon on its back; he had on one occasion

noticed a larva of the moth devouring one of the cocoons on the back of its neighbour, evidently mistaking it for a seed of the plant, which it exactly resembles in form.

Dr. Knaggs also exhibited the living larvæ of *Clostera anachoreta*, reared from the eggs deposited by a female bred during the present summer.

Mr. Waring exhibited some beautiful specimens of *Noctua sobrina*, *N. neglecta* and *Ypsolophus juniperellus*, taken in Scotland by Mr. Bouchard, during the past summer.

Mr. Waterhouse stated that he was anxious to correct three errors in his Catalogue of British Coleoptera, which had lately come to his knowledge; they consist of three species introduced into the list upon the authority of other entomologists, viz.:—*Homalota subterranea*, *Mulsant*; *Haploglossa rufipennis*, *Kraatz*, introduced on the authority of Mr. Janson; and *Ceuthorhynchus uliginosus*, *Walton*, taken from Mr. Walton's list of British Curculionidæ.

The *Homalota subterranea* of Mr. Janson I find, from the inspection of a specimen received from Mr. Janson by the British Museum, is the same as *Homalota scapularis* of my Catalogue.

The *Haploglossa rufipennis* of Mr. Janson is = *Haploglossa pulla* of my Catalogue, and is clearly not identical with *H. rufipennis* of Kraatz, of which there are specimens received from Dr. Kraatz in the Museum collection. The insect sometimes has the elytra pitchy black and sometimes rufescent, and has been recently taken in considerable numbers by Mr. Brewer, Mr. Rye and Mr. Lewis, always in the vicinity of the nests of the sand martin.

Ceuthorhynchus uliginosus of Walton is represented by a specimen presented by Mr. Walton to the British Museum, which I have carefully examined, and which proves to be *Cæliodes didymus*. It has a distinct rostral groove continued to the middle coxæ. A second specimen, named by Mr. Walton, is in Mr. Dale's collection, and has been kindly forwarded to me by its owner for examination; this is clearly a rubbed specimen of *Ceuthorhynchus litura*, as Mr. F. Smith had determined before I saw it.

Mr. Stainton read "A few Words on the Synonymy of *Laverna Langiella*."

Professor Westwood read descriptions of some new exotic Lucanidæ.—*E. S.*

Something like an Aquarium.—I have received a copy of the 'National Intelligencer,' Washington, September 26, in which is an account of the Boston Zoological Gardens. It appears from the following that our American brother naturalists have a tame whale and a pet dolphin, for we read:—"In the same tank with the white whale are two sturgeons, seven feet in length, likewise a fine specimen of a shark. There are also fifty other tanks, filled with fresh and salt water fish of the choicest specimens. Six hundred gallons of pure sea-water passes through the entire building per minute: the pipes for conveying the water are laid down through the streets of the city the same as ordinary water-pipes: eight hundred and sixty-four thousand gallons of this water passes through the central tank (which has a circumference of seventy-nine feet) per day."—*F. T. Buckland, in the 'Field.'*

[This is what I have always desired to see in this country, and at the period of the establishment of the Crystal Palace Company there was a strong feeling in favour of my project: it was, however, pronounced impracticable.—*Edward Newman.*]

The King of the Gorillas.—In M. Du Chaillu's book may be found the most incompatible exploits of his royal gorilla. Sometimes it is a tottering cripple; then the strongest beast of the forest; occasionally the determined foe of man; then, at once, flying before his presence. Never in the trees (its proper habitat), but always on the ground! At one time roaring lustily (apes never roar), and at another time punishing itself by beating its unoffending breast so unmercifully that the sound of the strokes might be heard a full mile off. This king—this Proteus ape—felled his black servant to the ground by a single blow from its giant fore leg; and then it frightfully lacerated the abdomen—not with its teeth (the proper weapons), but with its nails, which are flat, and as impotent as our own for the performance of such a butchery. In fine, let M. Du Chaillu and the learned naturalists who encourage him say and think what they choose of the “king of the gorillas,” *alias* the large black ape of Western Africa, its true position on the page of Natural History must certainly come to this, *viz.*—when on a tree it is a paragon of perfection in the eyes of an omnipotent Creator; but when on the ground it appears a “bungled composition of Nature.”—*Charles Waterton; Walton Hall, near Wakefield, October 20, 1861.—From the ‘Athenæum.’*

Notes on the Food of Birds. By HENRY L. SAXBY, Esq.

IN skinning and dissecting birds it has always been my habit to examine the contents of the stomach, with the view of acquiring such knowledge of the nature of their food as could be afforded by this means. The result of such examinations is almost invariably entered in my note-book at the time; therefore, although the accompanying list may contain but little that is absolutely new, its accuracy may be relied upon, and may perhaps be accepted as a sufficient apology for its length.

The name of any article of food printed in italics implies that although I have not been able to recognise it within the stomach of the bird, I have both seen and handled it after it has been left by the bird.

Peregrine Falcon (*Falco peregrinus*). Flesh, bones of birds, feathers of golden plover, bones and fur of rabbits, *ringed plover, kittiwake, wild duck.*

Hobby (*F. subbuteo*). Twite, large beetles.

Merlin (*F. æsalon*). Snow bunting, twite, Goërius olens, *blackbird, redwing, fieldfare.*

Kestrel (*F. tinnunculus*). Mice, large beetles, remains of small birds, *blackbird, yellowhammer, skylark, rock pipit.*

Sparrowhawk (*F. nisus*). Mice, yellowhammer.

Buzzard (*F. buteo*). Partridge, fieldfare, redwing, brambling, greenfinch, great titmouse, mice, earthworms.

Ashcoloured Harrier (*F. cineraceus*). Remains of small birds, earth-worms.

Longeared Owl (*Strix otus*). Mice, chaffinch, brambling, golden-crested regulus.

Shorteared Owl (*S. brachyotus*). Twite, tree creeper.

Barn Owl (*S. flammea*). Mice, young rats, house sparrow, remains of small birds.

Tawny Owl (*S. aluco*). Chaffinch, brambling, bones of fish.

Snowy Owl (*S. nyctea*). Rabbit.

Little Owl (*S. passerina*). Mice, spiders, large beetles, remains of small birds.

Great Gray Shrike (*Lanius excubitor*). Large beetles, *pie'd wag-tail*.

Redbacked Shrike (*L. collurio*). Flesh, large beetles, a species of cabbage butterfly, *Bombus terrestris*, *meadow pipit*, *chaffinch*, *blue titmouse*.

Woodchat Shrike (*L. rufus*). Large insects of various kinds.

Spotted Flycatcher (*Muscicapa grisola*). Small moths, gnats, house flies.

Pied Flycatcher (*M. atricapilla*). Small winged insects.

Dipper (*Cinclus aquaticus*). Water insects, fish-spawn, small trout.

Missel Thrush (*Turdus viscivorus*). Slugs, fine roots, earth-worms, berries of hawthorn and of dog-rose.

Fieldfare (*T. pilaris*). Small white slugs, land shells, earth-worms, fine roots, berries of hawthorn.

Song Thrush (*T. musicus*). Insects, small slugs, earth-worms, *large garden snail*.

Redwing (*T. iliacus*). Land shells, insects, hawthorn berries.

Blackbird (*T. merula*). Insects, earth-worms, gooseberries, strawberries, ivy berries, radish seed.

Ring Ouzel (*T. torquatus*). Insects, *Clausilia* ——— ?

Golden Oriole (*Oriolus galbula*). Insects.

Hedgesparrow (*Accentor modularis*). Insects, small earth-worms, turnip seed; and, upon one occasion, some fragments of oats.

Robin Redbreast (*Sylvia rubecula*). Earth-worms, seeds, caterpillars, small beetles.

Redstart (*S. phœnicurus*). Insects, small earth-worms.

Black Redstart (*S. lithys*). Small beetles.

Stonechat (*S. rubicola*) and Whinchat (*S. rubetra*). Small beetles, spiders, worms, caterpillars.

Wheatear (*S. ænanthe*). Insects of various kinds; minute land shells.

Sedge Warbler (*S. phragmitis*). Aquatic insects, small earth-worms.

Great Sedge Warbler (*S. turdoides*). Large water beetles; a jelly-like substance, probably the eggs of *Limnæa stagnalis*, which was very abundant in the pond by which the bird was killed.

Reed Wren (*S. arundinacea*). Aquatic insects.

Nightingale (*S. lusciniæ*). Small beetles, ants.

Blackcap (*S. atricapilla*). Small winged insects, raspberry seeds.

Garden Warbler (*S. hortensis*). Small beetles, smooth green caterpillars, spiders of various kinds.

Whitethroat (*S. cinerea*). Insects, eggs of spiders.

Lesser Whitethroat (*S. curruca*). Gnats, house-flies.

Wood Wren (*S. sibilatrix*). Small winged insects, portions of Ephemera.

Willow Wren (*S. trochilus*). Small winged insects.

Chiffchaff (*S. rufa*). Small winged insects, house flies, small beetles, caterpillars, bodies of butterflies, minute eggs of insects.

Dartford Warbler (*S. provincialis*). Gnats, *Epeira Diadema*.

Goldencrested Regulus (*Regulus cristatus*). Small insects.

Firecrested Regulus (*R. ignicapillus*). Small insects and their eggs.

Great Titmouse (*Parus major*). Flesh, beetles, flies, caterpillars, earth-worms; *young of chaffinch taken from the nest*. I have seen it boring holes in apples.

Blue Titmouse (*P. cæruleus*). Flesh, insects.

Cole Titmouse (*P. ater*). Insects, seeds, bread crumbs.

Marsh Titmouse (*P. palustris*). Insects.

Longtailed Titmouse (*P. caudatus*). Insects, seeds, fragments of buds.

White Wagtail (*Motacilla alba*). Aquatic insects.

Pied Wagtail (*M. Yarrellii*). Aquatic insects, gnats, fish bones, fragments of shells.

Gray Wagtail (*M. boarula*). Water beetles.

Grayheaded Wagtail (*M. flava*). Small worms, larvæ, aquatic insects, small univalves; occasionally small winged insects.

Ray's Wagtail (*M. campestris*). Insects. The stomach of specimens killed upon the sea-shore contained common sand-hoppers (*Talitrus Locusta*) and a species of fly which is very abundant among decaying sea-weed.

Tree Pipit (*Anthus arboreus*). Winged insects.

Meadow Pipit (*A. pratensis*). Insects, earth-worms, caterpillars.

Rock Pipit (*A. obscurus*). Sand-hoppers, flies of various kinds, larva of flesh-fly (*Sarcophaga carnaria*). I have sometimes seen this bird in the garden at Halligarth, usually upon the ground, but now and then in trees; upon such occasions I have found Aphides and small gray slugs in the stomach.

Skylark (*Alauda arvensis*). Insects, grass seeds, earth-worms.

Wood Lark (*A. arborea*). Beetles, small larvæ.

Snow Bunting (*Emberiza nivalis*). Grain, seeds, insects, small fibrous roots.

Common Bunting (*E. miliaria*). Grain, seeds, insects, sycamore buds.

Blackheaded Bunting (*E. schœniclus*). Water beetles, grass seeds.

Yellowhammer (*E. citrinella*). Insects, eggs of spiders, seeds of wild mustard (*Sinapis arvensis*).

Cirl Bunting (*E. cirlus*). Seeds of grasses.

Ortolan Bunting (*E. hortulana*). Insects, seeds, small caterpillars.

Chaffinch (*Fringilla cœlebs*). Grain, caterpillars, moths, seeds and cotyledons of various cruciferous plants.

Brambling (*F. montifringilla*). Grain, insects, seeds.

Tree Sparrow (*F. montana*). Insects, seeds, grubs, spiders.

House Sparrow (*F. domestica*). Insects, caterpillars, grain, young gooseberries, peas, seeds of various kinds.

Greenfinch (*F. chloris*). Insects, grain, small caterpillars.

Hawfinch (*F. coccothraustes*). Beech-mast.

Goldfinch (*F. carduelis*). Insects, seeds.

Siskin (*F. spinus*). Grass seeds.

Linnet (*F. cannabina*). Seeds of grasses, groundsel and thistle.

Lesser Redpole (*F. linaria*). Minute insects and their eggs; fragments of quartz, pieces of elm buds. I have never found the latter in such quantity as to induce me to depart from my belief that they are accidentally introduced into the stomach along with the insects which the bird obtains by breaking open buds.

Mealy Redpole (*F. borealis*). Seeds, minute insects, fine gravel.

Twite (*F. montium*). Seeds, insects, grain. In Shetland this species is very destructive to young turnips.

Bullfinch (*Loxia pyrrhula*). Buds of sycamore and birch; groundsel seeds.

Crossbill (*L. curvirostra*). Seeds of Scotch fir, Aphides; small caterpillars, which the bird finds in rolled-up elm leaves.

Starling (*Sturnus vulgaris*). Insects, flesh, winged insects, seeds, grain, sand-hoppers, pieces of fish (both fresh and salted).

Rosecoloured Pastor (*Pastor roseus*). Remains of beetles, and among them those of *Geotrupes putridarius* in considerable quantity.

Raven (*Corvus corax*). Flesh, large insects, grain, pieces of fish (both fresh and salted), *domestic fowls, ducks, eggs of various kinds.*

Crow (*C. corone*). Mice, large insects, common cockchaffer (*Melolontha vulgaris*), barley.

Hooded Crow (*C. corax*). Pieces of fish, shell-fish of several kinds, oats, large beetles, earth-worms.

Rook (*C. frugilegus*). Worms, large insects, *potatoes.*

Jackdaw (*C. monedula*). Insects.

Magpie (*C. pica*). Flesh, insects, cockchaffers and their larvæ, oats.

Jay (*C. glandarius*). Seeds, land-shells. The stomach of a specimen examined by me, in 1855, contained a few small seeds and the head of a small hobnail.

Green Woodpecker (*Picus viridis*). Insects, larvæ of ants, turnip seed.

Spotted Woodpecker (*P. major*). Small insects, beetles, earth-worms, seeds of mountain ash.

Lesser Spotted Woodpecker (*P. minor*). Small insects.

Wryneck (*Yunx torquilla*). Small insects.

Creeper (*Certhia familiaris*). Small insects, eggs of spiders.

Wren (*Troglodytes europæus*). Small insects, sand-hoppers, earth-worms.

Hoopoe (*Upupa epops*). Beetles, small flies, grubs.

Nuthatch (*Sitta europæa*). Seeds.

Cuckoo (*Cuculus canorus*). Caterpillars, small insects.

Kingfisher (*Alcedo ispida*). Fish, large beetles.

Swallow (*Hirundo rustica*), Martin (*H. urbica*), Sand Martin (*H. riparia*) and Swift (*Cypselus apus*). Winged insects.

Nightjar (*Caprimulgus europæus*). Cockchaffers, large moths.

Ring Dove (*Columba palumbus*). Cabbage-leaves, peas, grain, beech-mast, seeds of *Ranunculus acris*.

Stock Dove (*C. ænas*). Small seeds.

Rock Dove (*C. livia*). Grain, seeds, roots of couch grass (*Triticum repens*).

Turtle Dove (*C. turtur*). Leaves, corn.

Partridge (*Perdix cinerea*). Leaves, insects, hawthorn berries.

Redlegged Partridge (*P. rubra*). Corn, small seeds, leaves.

Quail (*P. coturnix*). Corn, seeds, small insects.

Stone Curlew (*Ædicnemus crepitans*). Insects, earth-worms, small sharp stones, small pieces of heather.

Golden Plover (*Charadrius pluvialis*). Fine roots, seeds of Carices, insects, earth-worms, sea-weed, mud, gravel.

Dotterell (*C. morinellus*). Earth-worms.

Ringed Plover (*C. hiaticula*). Marine and fresh-water insects, earth-worms, sand-hoppers, fragments of shells, small fibres of plants, gravel.

Kentish Plover (*C. cantianus*). Sand, marine insects.

Little Ringed Plover (*C. minor*). Insects, sand, a few fibres of plants.

Gray Plover (*Vanellus melanogaster*). Earth-worms.

Lapwing (*V. cristatus*). Earth-worms, grubs, marine and fresh-water insects, gravel.

Turnstone (*Streptilas interpres*). Marine insects, pieces of sea-weed, small univalves.

Sanderling (*Calidris arenaria*). Marine insects, small univalves.

Oystercatcher (*Hæmatopus ostralegus*). Marine and fresh-water insects, limpets, shrimps of several species, earth-worms.

Heron (*Ardea cinerea*). Water vole, mice, frogs, trout, large water insects and their larvæ, *Dytiscus marginalis*. I once saw a heron kill a small duckling, but without making any attempt to swallow it afterwards.

Bittern (*A. stellaris*). Trout, dace, large beetles.

Curlew (*Numenius arquata*). Marine and fresh-water insects, earth-worms, gravel.

Whimbrel (*N. phæopus*). Marine and fresh-water insects, earth-worms, small gray slugs.

Redshank (*Totanus calidris*). Insects, small marine univalves.

Green Sandpiper (*T. ochropus*). Small beetles.

Wood Sandpiper (*T. glareola*). Fibres of plants, minute aquatic insects.

Common Sandpiper (*T. hypoleucos*). Small pupæ, marine and fresh-water insects, sand-hoppers, flies from decayed sea-weed.

Spotted Sandpiper (*T. macularius*). Coarse gravel, minute worms.

Greenshank (*T. glottis*). Marine insects, fine sand.

Blacktailed Godwit (*Limosa melanura*). Marine insects, sand.

Woodcock (*Scolopax rusticola*). Insects, earth-worms.

Great Snipe (*S. major*). Earth-worms.

Common Snipe (*S. gallinago*). Earth-worms, insects, fibres of plants.

Jack Snipe (*S. gallinula*). Fibres of plants, mud.

Curlew Sandpiper (*Tringa subarquata*). Marine and fresh-water insects, sand.

Knot (*T. Canutus*). Marine and other insects, slugs, earth-worms, small marine univalves and bivalves.

Little Stint (*T. minuta*). Marine and fresh-water insects.

Dunlin (*T. variabilis*). Marine and other insects, small slugs, earth-worms.

Purple Sandpiper (*T. maritima*). Marine insects, small univalves, minute aquatic plants.

Land Rail (*Gallinula crex*). Small beetles.

Spotted Crake (*G. porzana*). Insects, small seeds.

Little Crake (*G. pusilla*). Small beetles.

Moorhen (*G. chloropus*). Insects, aquatic plants.

Water Rail (*Rallus aquaticus*). Earth-worms, small beetles.

Coot (*Fulica atra*). Aquatic plants.

Graylag Goose (*Anser ferus*). Grass.

Brent Goose (*A. bernicla*). Sea-weed, coarse sand.

Common Shieldrake (*Anas tadorna*). Marine insects, shrimps, small crabs, sand.

Shoveller (*A. clypeata*). Aquatic insects, mud, coarse sand.

Pintail Duck (*A. acuta*). Aquatic insects, pieces of small trout.

Wild Duck (*A. boschas*). Aquatic plants, marine and fresh-water insects, small roots, barley, coarse sand.

Garganey (*A. querquedula*). Sea-weed.

Teal (*A. crecca*). Aquatic plants, insects, sand.

Wigeon (*A. Penelope*). Grass.

Eider Duck (*A. mollissima*). Small fish.

Common Scoter (*A. nigra*). Fragments of shells, sand, small stones.

Longtailed Duck (*A. glacialis*). Marine univalves, sea-weed, sand.

Pochard (*A. ferina*). Marine univalves, sand.

Scaup Duck (*A. marila*). Marine univalves, fragments of shells, small stones (usually of a dark colour).

Tufted Duck (*A. fuligula*). Marine univalves and bivalves, fish-spawn.

Goldeneye (*A. clangula*). Small trout, insects, aquatic plants.

Smew (*Mergus albellus*). Fish.

Redbreasted Merganser (*M. serrator*). Fish, shrimps.

Rednecked Grebe (*Podiceps rubricollis*). Small fish.

- Sclavonian Grebe (*P. cornutus*). Shrimps, small pieces of sea-weed.
- Little Grebe (*P. minor*). Insects and their larvæ, fine roots, pieces of down.
- Great Northern Diver (*Colymbus glacialis*). Fish, particularly the sand-launce (*Ammodytes lancea*); common sand-worm (*Arenicola piscatorium*).
- Redthroated Diver (*C. septentrionalis*). Trout, small sea-fish, large insects.
- Guillemot (*Uria troile*). Fish, small fragments of sea-weed.
- Ringed Guillemot (*U. lacrymans*). Fish.
- Black Guillemot (*U. grylle*). Fish, small crabs, marine univalves.
- Little Auk (*U. alle*). Bones of small fish.
- Puffin (*Mormon fratercula*). Fish, shrimps, sand.
- Razorbill (*Alca torda*). Fish.
- Cormorant (*Carbo cormoranus*). Trout, plaice, eel, sand-launce, sillack, or young of the coal-fish (*Gadus carbonarius*).
- Shag (*C. cristatus*). Plaice, sillack.
- Gannet (*Sula bassana*). Fish.
- Common Tern (*Sterna hirundo*). Sand-launce.
- Arctic Tern (*S. arctica*). Fish, large beetles, moths.
- Blackheaded Gull (*Larus ridibundus*). Fish, insects, grubs, slugs, small snails, earth-worms, fine roots of plants.
- Kittiwake Gull (*L. tridactylus*). Fish, aquatic plants, small beetles.
- Ivory Gull (*L. eburneus*). Fish, blubber.
- Common Gull (*L. canus*). Flesh, fish, insects, earth-worms, slugs.
- Lesser Blackbacked Gull (*L. fuscus*). Fish, insects, sea-weed, barley.
- Herring Gull (*L. argentatus*). Flesh, fish, insects and their larvæ, slugs, earth-worms, fragments of shells, *crabs of various kinds, starfish, Echini*, grain, turnip, coarse sand.
- Great Blackbacked Gull (*L. marinus*). Flesh, *young of cormorant*, fish.
- Glaucous Gull (*L. glaucus*). Flesh, blubber, fish.
- Richardson's Skua (*L. Richardsoni*). Fish, *eggs of common gull*.
- Manx Shearwater (*Puffinus anglorum*). Bones of fish.
- Storm Petrel (*Thalassidroma pelagica*). Pieces of fish-liver.

HENRY L. SAXBY.

Balta Sound, Shetland,
September 24, 1861.

Occurrence of the Spotted Eagle near St. Columb, Cornwall. — Another specimen of this rare eagle has made its appearance in Cornwall during the past week. It was shot in the parish of St. Mawgan, near St. Columb, and it was reported in the local papers as being the golden eagle. The bird was sent to Mr. Vingoe for preservation, and in this way it has come under my immediate observation. I have examined it minutely this morning, and it is quite as good a specimen, and pretty nearly in the same state of plumage, as the one shot at Trebartha in December last. Both are in the state of plumage denoting them to be birds of the year, with the yellow spots and blotches on the quill and scapularies extending over a considerable portion of the feathers. In the specimen now under notice the yellow over the back and scapularies is even more predominant than in my bird, and there is also a greater amount of yellow mixed with brown on the belly and under parts, approaching to almost a pure buff-yellow on the under tail-coverts and the thighs; the ciliated feathers on the neck have the extremities rather paler than in my bird. The bird was gorged with horse-flesh, and in very low condition. Length 2 feet 3½ inches. — *Edward Hearle Rodd; Penzance, November 6, 1861.*

Occurrence of the Rosecoloured Pastor near York. — A beautiful specimen of this rare bird has been shot, and another seen, in this neighbourhood. The cock bird was shot, and he was in full feather. — *J. Ranson; York.*

Tomtit's Nest in a Stone Bottle. — A large stone bottle, having been left in our garden to sweeten, was taken possession of by a tomtit, who built a nest in it. Although the bottle was wanted, it was given up, and in due time the young ones were introduced into the world through a bottle neck. The tomtit is called in Yorkshire "billy biter." — *Id.*

Extraordinary Gathering of Magpies. — Never having heard that magpies either congregate or fly in flocks, I was greatly surprised, on returning from a drive yesterday, about 5 o'clock P.M., to see a number of these birds fly out of some old trees close to this village, and join in the air at a little distance from the trees (at about the same elevation as their highest branches from the ground), and sufficiently close to enable me not only to distinguish the black and white feathers of their plumage, but also the peculiar fan-like expansion of their tails when flying. I counted twenty, and believed there were a greater number in the flock, which flew very close together: my servant says he counted twenty-one. Is this a common occurrence? — *F. Battersby; Balnalack, Rathowen, West Meath, October 30, 1861.*

The Tree Sparrow (Passer montanus). — The tree sparrow is very common in this neighbourhood (ten miles west of York). They are less than the house sparrow, and are here called redheaded sparrows, from the colour of the feathers on the head, which are more or less of a reddish brown. The cock of the house sparrow may be readily distinguished from the female by the darker colour of the feathers on the head, and the patch of black feathers which extend from the base of the bill a considerable way down the breast, and which are entirely wanting in the female. In the tree sparrow these black feathers are found extended from the base of the bill down the breast in both sexes. The nest is generally placed in a hole in a tree (old pollards are preferred), and sometimes (but rarely) in a hedge, in which case the nest is domed, with a hole in the side for admission. The interior of the nest is a mass of poultry-feathers. The eggs are smaller, rounder, and of a darker colour than the eggs of the house sparrow. Last year above a hundred eggs passed through my hands, and I found less variety in them than in those of the eave sparrow, whose eggs vary in shape and colour more

than any other birds' eggs that I know of. Great numbers of the tree sparrows are caught here in traps every winter, when they seek the shelter of the fold and stack-yard, and are sold to the constable for a halfpenny each.—*J. Ranson ; York.*

Cuckoos' Eggs in Reed Warblers' Nests.—With reference to Mr. Ramsden's description (*Zool.* 7757) of a young cuckoo having been found by him in a reed warbler's nest, I can certainly state, on my own experience, that such an event is by no means uncommon. I am aware that Yarrell does not include the reed bird's nests amongst those in which cuckoos' eggs are generally laid, nor was it inserted either in a recent list published in the 'Field;' yet I believe that any one accustomed to watch the habits of our marsh birds in those most favourable of all districts, the "Norfolk broads," would be able to recall more than one instance of the cuckoo's egg being found in the deeper hollow of the reed bird's structure. During the last summer no less than four cases have come under my own notice, and those under somewhat peculiar circumstances. About a mile from this city, at a place called Harford Bridges, a large reed-bed by the river-side adjoins a garden belonging to some neighbouring cottages. In this one locality four or five nests of the reed warbler have been found, built into various bushes, such as currant, alder, gooseberry, &c., yet still retaining their ordinary character, the materials being carefully wound round two or more twigs in each bush, in the place of the reed-stems, their more usual support. The green leaves hanging over the nests in these cases have an exceedingly pretty effect, and in one instance bunches of currants as well hung temptingly over the entrance to this compact little edifice. Whether the unusual locality of these various nests took the fancy of the cuckoos in that district, the access to them being easier than when built on the reeds, I cannot determine; but three out of the four contained cuckoos' eggs, and the fourth, discovered later than the rest, had a cuckoo as its only tenant. Anything more absurd than the appearance of this "big baby," firmly wedged into the nursery of its foster-parents, it is impossible to conceive, the utter disproportion between the nest and its occupant being only equalled by the contrast between the poor little reed birds and this infant Hercules. Other instances in which both eggs and young have been found, as in Mr. Ramsden's case, in ordinary nests suspended on the reeds, have from time to time come under my notice. There can therefore be no reason for any longer excluding the reed warbler from the list of feathered unfortunates to whom the cuckoo intrusts the rearing of its progeny.—*H. Stevenson ; Norwich, October 26, 1861.*

Curious Anecdote of the Common Partridge.—Last year a partridge, having made a nest and laid fourteen eggs, began to sit, but was driven off by a domestic hen, who took her place and continued to sit upon them until they were hatched, when the mother took away the young ones from the hen. I was told, before the young ones were hatched, that such would be the case, but I was incredulous.—*J. Ranson ; York.*

Wild Swans at Swansea.—A flock of wild swans passed over our bay on Monday last. One of them was shot on the sands near Riston ferry; it proved to be a young bird.—*D. Williams ; 56, Wind Street, Swansea, October 30, 1861.*

Occurrence of Richardson's Skua at Horning Fen.—On Saturday last a fine example of Richardson's skua was brought to my house by a labourer, who shot it at Horning, in the midst of a snow storm in the fens.—*W. Winter ; Aldeby, November 9, 1861.*

The Poison of the Toad.—The most deadly poison known to be used by the slaves in Brazil is that of the toad. The skin of this reptile contains glands which secrete in abundance a milky glutinous fluid when the toad is put to pain or irritated. This is scraped off and dried. It produces incurable obstruction and enlargement of the liver, and a speedy death. Some beat the toad with rods to make it secrete the venom, others place the animal in an earthen vessel over a slow fire.—*R. de Gambleton Daunt*, in 'Dublin Medical Press,' September 25.

Occurrence of the Sword-fish on the Norfolk Coast.—On the 30th of October a sword-fish was obtained at Mundsley, in Norfolk. The fish, which is said to have been seen occasionally near the same locality for some days previously, was on this occasion observed in some shallow water, and, being in fact partially stranded, was captured by a noose being passed over its tail, after which it was drawn on shore. The length of this specimen, from the tip of the sword to the centre of the tail, was nine feet five inches, the sword alone being three feet in length. The stomach of the fish was empty. Its flesh, when dressed, was white and palatable, and not unlike that of the sturgeon.—*J. H. Gurney*; *Catton Hall, Norwich*, November 4, 1861.

Mode in which Pholades perforates solid Substances.—During a walk on the rocks, between tideways, at Brighton, a few days back, my attention was drawn to a quiet shallow pool, the sandy bottom of which was discoloured by several white patches, each about the size of a shilling. On examination these patches appeared to be heaps of powdered chalk (the rocks are upper chalk), surrounding the mouths of holes of Pholades. That they were ejected by Pholades, and were no doubt the products of their work in excavating the rock, was shown almost immediately by a cloud of the white dust being discharged from one of the Pholades and settling down on the heap around it. Thinking it just possible that this observation may be deemed worthy of record, as pointing to the mechanical action of the Pholades' mode of excavation, I take the liberty of forwarding it to the 'Zoologist.' On a subsequent day I watched a Pholades in a similar pool, to ascertain the rate at which it works. Several in the pool were excavated, though the proportion of workers was not large compared with the whole number of Pholades in the pool. My attention was entirely directed to one specimen separated from the rest. Although the tide had receded from the pool for some time, the animal appeared to have thrown out but one discharge of chalk, or of the white powder, which I assume to be chalk-dust. After watching it for about a quarter of an hour, there was a discharge chiefly of chalk. In six minutes more there was another with scarcely any chalk, and due apparently to the animal's siphons being irritated by some extraneous substance. In the course of the next minute there were perhaps two or three discharges of water and a little sand, but no chalk. For the next three-quarters of an hour there was no further discharge of chalk, although I could not unfrequently see the siphons moving from side to side within the hole. This animal appears to have been working very slowly.—*R. Hudson*; *Rowington, near Warwick*.

Carnivorous Taste of Limax maximus.—Our dairy window is overhung by ivy, in

which the black-striped snail finds a shelter. These snails frequently make their way through the lattice window into the dairy shelf, where the meat is kept, and I have frequently found them feeding on raw beef. Mr. Curtis has remarked this liking of *Limax maximus* for flesh.—*J. Ranson ; York.*

Economy of Apatura Iris. — Dr. Maclean, to whom I am indebted for the early history of this lovely butterfly, watched a female deposit two eggs on the upper side of two leaves of *Salix Capræa* (the willow), on the 16th of July: the egg somewhat resembles a fossil *Echinus* which has lost its spines. One of these eggs the Doctor took home, and it hatched on the 25th of July, just nine days after it was laid; the egg left on the leaf where its parent had deposited it hatched on the 28th of the same month, having been in the egg state twelve days. The little larvæ are of a dark brown colour: on the eighth day after being hatched they change their skin, and then are furnished with two horns or processes, attached to and forming part of the head; and it is curious that now, on the first appearance of these horns, they are proportionally larger and longer than at any other period of the creature's larval life. With this first change of skin the larva loses every tinge of its original brown colour, and becomes exactly of the same hue as the willow-leaf on which it feeds: a portion of the leaf is consumed every day, but the mid-rib is left intact; and the little creature, when resting from its alimentary labours, climbs to the denuded bristle-like tip of this mid-rib, and there remains perfectly motionless, with the anterior extremity raised as we see it in the larvæ of *Sphinx Ligustri* and *Dicranura vinula*. Dr. Maclean's larva continued this mode of life until the 15th of November, when it descended from the leaf, and, covering with silk the rind of the twig immediately below the attachment of the leaf, grasped this web firmly with its claspers; stretched itself out at full length, with its horns protracted before it, and thus settled itself down to endure the winter's cold and the winter's storms. This is always the case; its *modus operandi* is the same whether in a state of nature or in the vivarium of an entomologist. Instinct, that infallible and inscrutable guide, tells the unreasoning larva that dehiscence of the leaf-stalk will take place after the first frost, and that the leaf will fall to the ground: the leaf does fall, but not until its falling is a matter of indifference to the larva; not until the larva has attached itself so firmly to the twig that neither wind nor rain can remove it. In the ensuing spring, the same influences which compel the willow to throw out new twigs and new leaves, also resuscitate the torpid or dormant larva; its eating propensities are aroused, and it feeds greedily until the period of its first metamorphosis has arrived. The full-grown larva somewhat resembles a slug in shape, and a willow-leaf in colour; the head is of a very peculiar form, each of the lateral divisions being prolonged on the crown into a kind of horn slightly inclining outwards; these horns are green, darker and almost black at the tips, and the space between them is of a pale yellow colour, approaching to white, but there is a pointed triangular green plate above the mouth, which enters into and almost divides the yellow part: the body is green, stoutest in the middle, and tapering to each end, but mostly towards the tail, where it terminates in two sharp points, parallel, closely approximate and directed backwards: on each side is a narrow yellow stripe traversing the region of the spiracles, and extending the entire length; and besides this there are seven oblique yellow stripes on each side, all of them commencing near the straight lateral line

already described, and running upwards and backwards, but not meeting on the back: the third of these lines is the longest; each segment of the body has also several series of yellowish white and slightly raised dots completely encircling it. About the middle of June the larva suspends itself by the tail, and in that position changes to a stout and rather awkward-looking pupa, the wing-cases of which are dark green, and the abdomen yellow-green, with very faint indications of paler oblique lateral stripes, similar to those I have already described in the larva. The head hangs downwards, and terminates in two small points or ears. The perfect insect appears on the wing early in July, and the male has always been celebrated for his lofty and graceful flight: he is particularly fond of the oak, and, after wearying himself with aerial gambols above and around some lofty monarch of the wood, will settle on a leaf, and remain stationary until another male makes his appearance, when the first will leave his station and join the intruder in what appears to be an amicable struggle in the air, each striving to get above the other: when tired of this exercise, each butterfly will often descend to the identical leaf from which he rose, and again close his wings as if at rest. The female flies but seldom, usually remaining on the stems or twigs of the underwood, where she is sought by the male. These beautiful butterflies seem to be attracted by the odour of putrefying flesh, or even still more disgusting substances, and with uncoiled maxillæ may occasionally be found feasting on the moisture which oozes therefrom. I regret that I cannot represent them as banqueting on the nectar of flowers, or feasting on some equally poetic and appropriate food; but such is not the case; and in these and similar cases of depraved appetite we can only lament a fact as incontrovertible as it is unsatisfactory, repeating the somewhat trite but ever sapient axiom, *de gustibus non est disputandum*.—Edward Newman.

Description of the Larva of Smerinthus Populi. — Never rolls in a ring or feigns death when disturbed; rests with the head and anterior part of the body slightly elevated. Head somewhat triangular, the apex of the triangle being the crown of the head: body decidedly but very gradually attenuated in front, and as gradually increasing behind to the 12th segment, which bears a very short, nearly straight, obliquely pointed horn; body throughout transversely folded, the interstices of the folds rather deeply incised in front. Head shining, apple-green, with two bright yellow lines approaching on the crown, where they are often tipped with pink, and distant at the mouth; body yellow-green, rough with minute points like sbagreen; these points are yellow, and are mostly arranged on the summits of the folds, but also forming seven very perceptible oblique lines on each side; each of these commences near a spiracle, and extends upwards and backwards, the seventh terminating in the horn, which is reddish at the base, pale at the summit, and very scabrous: the spiracles are usually accompanied by, but not included in, a pink marking. There is a beautiful and not uncommon variety of this larva, which has a series of ten conspicuous and nearly square red spots on each side of the back, one just in advance of each oblique line already described. Feeds on various species of *Populus* (poplar) and *Salix* (salow); full fed in August and September, when it descends to the ground, and changes to a rough and always dirty-looking pupa, on or very near the surface of the ground, where it remains throughout the winter. I have never seen any indication of either an earthen or silken cocoon.—*Id.*

Description of the Larva of Nola cucullatella. — Rolls itself in a ring and falls off its food-plant, feigning death, when disturbed. Head small: segmental divisions of the body strongly marked, each segment having six prominent shining warts, and each

wart emitting a number of radiating bristles. Head black, shining, with a white median stripe; body mottled with dark smoke-colour and dingy white, the white forming a very obvious but narrow median dorsal stripe: all the warts are testaceous: legs intensely black and shining; claspers and belly greenish gray. Feeds on *Cratægus Oxyacantha* (whitethorn), and is full fed at the end of May, when it spins a compact cocoon, attached to the stem of its food-plant. The moth appears about the end of July. I am indebted to Mr. Thomas Hockett for this larva, as well as the two which follow.—*E. Newman.*

Description of the Larva of Callimorpha dominula. — Rolls in a compact ring and falls off its food when touched. Segments distinctly marked, each bearing nine or ten shining black warts or excrescences, and each wart emitting a number of diverging bristles. Ground colour of the body velvety opaque black, but interrupted by and adorned with three longitudinal series of compound bright yellow spots: each series is composed of eleven such spots; one series dorsal and median, the others lateral; and in the lateral series the yellow spots alternate with others of a snowy whiteness, but much smaller: legs black, shining; claspers and belly blue-gray. The spines on the back are black, on the sides white. Feeds on various herbaceous plants, particularly *Cynoglossum officinale* (hound's-tongue) and *Urtica dioica* (stinging nettle). The egg is laid about Midsummer, and the young larva hibernates at the root of its food-plant; in April it again commences feeding, and is full fed in May, when it spins a loose cocoon among the leaves of its food-plant, and there changes to a chrysalis: the moth appears on the wing about Midsummer.—*Id.*

Description of the Larva of Crocallis elinguarina. — Rests in a nearly straight position; does not fall off its food-plant or feign death when disturbed. Head prone, partially withdrawn beneath the skin of the 2nd segment. Segments of the body slightly swollen beneath; back of 12th segment slightly raised, the raised portion crowned with two small transversely placed warts, each of which emits a short black bristle; similar short black bristles are scattered over every part of the body. Colour of both head and body uniform grayish brown, unadorned by any markings susceptible of definition. Feeds on *Cratægus Oxyacantha* (whitethorn), makes a slight cocoon in the surface of the earth, and the moth appears in July.—*Id.*

Description of the Larva of Cidaria dotata.—Rests on the posterior legs, with the head erect and the prolegs contracted. Smooth, without humps or warts, long and slender, attenuating towards the head. Pale yellowish green; dorsal line darker; subdorsal lines pale yellow, indistinct. Feeds at night, on the black currant (*Ribes nigrum*). Habit very sluggish, remaining sometimes for several days on one twig, feeding on all the leaves within its reach before changing its position. The eggs were laid on the 3rd of August, and hatched in the second week of April. Full fed at the beginning of June. Spins a slight cocoon on the surface of the ground. Pupa pale yellow, semitransparent. The perfect insect appeared at the end of June.—*Percy C. Wormald*; 10, Priory Road, Kilburn, November 6, 1861.

Sugaring on a Turf Moss.—During the months of August and September I went to our mosses nearly every night, to try what I could take on the heath-blossoms. I tried for nearly a fortnight with little success, only catching a few *Celæna Haworthii* before dark; they were flying at a most furious rate. By sweeping I got next to nothing,—only plenty of *Noctuæ* and the larvæ of *Eupithecia*. Then I visited the ragwort-blossoms on the edge of the moss, but only took a single *C. Haworthii*, plenty of *Agrotis nigricans*, a few *A. aquilina*, and a fair number of common species.

The next plan I resorted to was to take a lot of ragwort and plant it on bare parts of the moss, giving it a good sprinkling with sugar, with a double dose of rum, to counteract the opposition of the heath-bloom: this was the key to the business. I soon had *C. Haworthii* by the score, *Apamea nictitans* and *Agrotis agathina* every night, and hundreds of other Noctuæ and beetles in profusion. I killed a great number of the common species, because they ate the sugar off so fast; and it was the means of bringing plenty of *Carabus granulatus* prowling about, dragging moths away and seizing them when alive after being shook off the flowers. Frogs and toads mounted the flowers to share in the feed. I was most surprised to find *Orgyia antiqua* a visitor; it dropped down, when shook off, in the same manner as the Noctuæ, until I pinned it. *Gortyna flavago*, *Plusia festucæ* and *Heliothis peltigera* were visitors. I noticed one insect, namely, *Luperina testacea*, was feeding on reeds close by, along with *Nonagria fulva*: neither of these species was tempted from its ordinary fare. I also saw what I supposed to be glow-worms: I turned my lamp on, to show them to a man that was with me, but none could I find, only *Nebria* running about: the Rev. A. Matthews' article on the phosphorescent appearance of *N. brevicollis* (Zool. 7803) at once gave me a clew to my vanished luminaries of the night.—*J. B. Hodgkinson; Penwortham Mill.*

Capture of Dasypolia Templi in Ireland.—As a worthy finish to my collecting in Ireland, I have had the pleasure of taking, at the end of October, several fine specimens of *Dasypolia Templi* on the coast near Dublin.—*Charles G. Barrett; Camelon, near Falkirk, November 6, 1861.*

Description of the Larva of Aplecta tinctoria.—Falls off its food-plant, feigns death, and rolls itself in a ring when touched or disturbed. Head small in proportion to the body: body soft, fleshy, the divisions of the segments very distinctly marked by depressed rings; on the segments themselves are numerous depressions; and along the sides, in the region of the spiracles, are various conspicuous skin-folds. Head very shining, testaceous-brown: body pale raw-sienna brown, irrorated with both white and black markings, so small as to be scarcely perceptible to the naked eye, and having also a very inconspicuous double median dorsal stripe composed of black dots, the intervening very narrow space being nearly white; the spiracles are black: the legs and claspers of the same colour as the body. Feeds on *Betula alba* (birch), and appeared nearly full grown at the end of October. I am indebted to Mr. G. Mawson for specimens of this larva, which he bred from the egg.—*Edward Newman.*

Orodesma apicina a Native of Honduras.—It is stated by Mr. Douglas (Zool. 7768) that the only known specimens of *Orodesma apicina* have been captured in England. I beg to state that a specimen is in the Norrisian collection, with many other undescribed Noctuæ taken by the late Mr. Haskine in Honduras.—*Samuel Carter; 20, Lower Mosley Street, Manchester, November 1, 1861.*

Economy of Achroia grisella.—Before I left home I had the pleasure of observing this species under favourable circumstances. In June I obtained a number of hibernated larvæ, and placed them in a glass case. The way in which they formed galleries was very interesting; they worked under cover, spinning their web loosely and then thrusting it forward. At the slightest disturbance they became perfectly motionless. In the beginning of July perfect insects began to make their appearance in my case, and I went to the apiary from which I obtained the larvæ, and found perfect insects there in great abundance. They flutter much as bees do before the entrance of the hive. The males are usually much smaller than the females. I shut up a male

and a female together. I did not observe them *in cop.*, but in a few days I saw the female laying eggs. Her ovipositor was very long, and she felt about with it before laying an egg, as if in search of a spot suited to her purpose. The eggs were of a regular oval, and of a milk-white colour. I left home before they were hatched.—*Thomas Fyles ; Point Levi, Canada, August 6, 1861.*

Note on the Larvæ of the Genus Depressaria.—During the present summer I found large quantities of larvæ feeding at the top of thistles, both on the leaves and in the stem. I expected of course to take a few scores of *Depressaria carduella*: what should they turn out to be but *D. angelicella*, the same as those I was breeding from *Angelica*! I also found some scores of larvæ feeding on *Angelica sylvestris*: they were all *Depressaria pimpinella*, not a very common species. When I was in Cumberland, a short time ago, my friend Mr. G. Mawson had bred several *Depressaria nervella* from henbane (*Hyoscyamus niger*). I have bred *D. liturella*, *D. atomella*, *D. arenella*, and *D. ocellella* from umbelliferous plants.—*J. B. Hodgkinson ; Penwortham Mill.*

Cynips Rosæ spinosissima.—Visitors to the sea-side in the summer months must have noticed the curious red balls that beset the pretty little burnet rose (*Rosa spinosissima*). Hardly any part of the plant seems free; the calyx itself is made to assume unnatural proportions, while the stem and leaf-stalks offer a series of little wens of varied size and form. These are the work of a tiny gall-fly (*Cynips*) that pierces the plant and causes the sap to stagnate in these strange excrescences. Each ball is usually tenanted by a single *Cynips*, which finds therein its nutriment and shelter till it puts on wings and leaves its singular home. The galls are smooth, thus differing from the bedeguar of the hedge rose. This circumstance, I may remark, is the more strange when we consider how much more spiny is the stem of the burnet rose than that of our friend of the green lanes and hedges. I have lately hatched several of this *Cynips*. Its characters are here given:—

CYNIPS ROSÆ SPINOSISSIMÆ, *Inchbald.*

Colour black. Antennæ geniculated, hairy. Head and thorax dull black, pitted and dotted over with gray pile. Abdomen shining black. Legs black, with the tarsi paler. Insect much smaller than the *Cynips Rosæ*.—*Peter Inchbald ; Storthes Hall, August 30, 1861.—Intelligencer.*

Correction of an Error in Name.—The insect named by me as *Eupæcilia dubitana* (Zool. 7860) is identical with *Eupæcilia albicapitana* described by Mr. Cooke in the same page: I was not aware of this until it was pointed out to me by Mr. Cooke at Liverpool.—*Charles G. Barrett ; Camelon, near Falkirk, November 6, 1861.*

Descriptions of Larvæ.—Most earnestly do I entreat assistance in this department of the science of Entomology: Mr. Crewe, Mr. Hellins and Mr. Buckler have already exerted themselves nobly in this good cause, and I would far rather publish their descriptions than my own; but when entomologists decline the trouble, and will favour me with the specimens, I shall be only too happy to devote my time to the task. May I also venture on a request—that the six thoracic legs should always be called “legs,” and the abdominal appendages “claspers”?—the term “prolegs,” properly meaning “fore legs,” is used without any rule or regularity, and is therefore objectionable: after reading Mr. Wormald’s otherwise excellent description (Zool. 7822) of the larva of *Cidaria notata*, I am quite unable to decide whether legs or claspers are intended by the term “prolegs.”—*Edward Neuman.*





