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OF

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"There is scarcely any well-informed person, who, if he has the will, has not also the power to add something essential to the general stock of knowledge, if he will only observe regularly and methodically some particular class of facts which may most excite his attention, or which his situation may best enable him to study with effect."—HERSCHELL.

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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.

THE ZOOLOGIST

FOR 1860.

Stray Notes from the Devonshire Coast.
By Henry Stevenson, Esq.

A new field of observation has ever its attractions for the naturalist, whether affording novelties for careful study or simply a repetition of familiar forms, whose habits, varying somewhat according to the nature of the locality, have still fresh interest for the close observer. Such, at least, was my experience last spring, during a short visit to Torquay and Teignmouth, and although, ornithologically speaking, that district afforded little that might not be found also on our Norfolk coast, yet even in the habits of some of the more common species, occasional peculiarities not seen elsewhere, struck me as worth recording in a few short notes.

Gulls, divers and other sea birds, necessarily forming the chief objects of attraction in such localities, I will for once reverse the general order of things, and commence with the common gull.

Common Gull (*Larus canus*). This species is here, as indeed on most parts of our coast, extremely numerous, and is met with at all times of the day on the river, being perhaps less of a sea gull than any of its tribe, especially in its habit of frequenting fields far inland, following the plough like rooks in search of worms and grubs. At low water these birds collect in large quantities along the course of the Teign, dispersing themselves in groups over the extensive sand-banks left bare by the tide, and freely mingling with their sable companions from adjacent rookeries, carrion crows and jackdaws, crowd the waters edge in search of food. The stream at this time being too shallow for the passage of boats, they are but little disturbed in their researches, and from long habit are perfectly indifferent to the presence of certain cockle-hunting females, who as regularly follow up the retiring waters to rake the shell-fish from their sandy beds. On a clear

sunny day the appearance of these birds, dotted like white specks as far as the eye can reach, some wading or pitching into the shallow water, others pacing up and down or fluttering onwards to fresh ground, their white breasts glistening in the sun, gives to the whole scene an amount of life and animation that cannot fail to strike even the most indifferent. At high water numbers of them are seen hovering over the harbour, searching for any refuse thrown over from the boats and vessels, or rounding the "Ness Point," at the mouth of the river, in short flights out to sea; and, from their generally making up for this point as the sun goes down, I presume they roost amongst the neighbouring cliffs. The old birds up to the first week in April still carried more or less the gray markings on the head and neck peculiar to the winter plumage, but so varied in amount that scarcely two birds appeared alike. One or two young specimens also that I shot showed as much diversity of colouring, both above and below, in the gradual assumption of their dull dress. None of these had attained the scarlet eyelid, which gives so striking an appearance to the old birds, both of this and the kittiwake species, and the feet and legs were rather livid than green. The gape and whole inside of the mouth in the old bird is rich salmon-colour, but in the young dull green.

Kittiwake Gull (*Larus tridactylus*). The first pair of this elegant species I saw hovering over Torbay, and I afterwards met with several at different times whilst at Teignmouth. These birds seemed to mix but little with the common gulls, and frequented rather the seaward side of the "Bar" than the river, though probably wending their way upstream at low water. On the 25th of March I shot an old male and a young one just off the mouth of the river. The adult bird still carried a patch of gray on the hind neck, but was otherwise in full breeding plumage; the eyelids bright scarlet. The young one was a true "tarrock," having the bars on the wings and lower part of the neck behind, as well as the tips of the tail feathers brownish black; eyelids dark brown.

Greater and Lesser Black Backs and Herring Gulls. Just after my arrival at Teignmouth, it blew a perfect gale from off the sea for a day or two, which drove the larger gulls in great numbers into the harbour. Fine old birds of both greater and lesser blackbacks passed and repassed the long bridge, lazily floating on their wide expanse of wing, their pure "black and white" showing nobly in the sun. These, however, soon departed as the storm went down, and as soon almost as it was possible to take a boat up the river they had returned again to the "bosom of the deep," leaving only a straggler here and there amongst

the younger birds. The herring gulls, both old and immature, continued to frequent the river at times, but the weather remaining calm the blackbacks, at least the adult birds, did not recross the "Bar," nor did I notice any, even out at sea. The thickness of the down and feathers as well as of the skin in these larger gulls is perfectly extraordinary, an ounce of number six, or even four, having little, if any, effect upon their natural armour, and it was not till I obtained some swan shot to mix with them that I succeeded in getting the specimens I required. On skinning a very fine young bird of the greater blackback, whose wing had been broken by one of the large pellets, I found some of the small shot literally rolled up in the down, never having entered the skin, and yet my gun, though a light one, shoots unusually sharp.

Blackheaded Gull (*Larus ridibundus*). A pair of these birds passed high over head on two occasions, coming from inland along the course of the river, but I never saw them amongst the other species: they probably have a breeding-ground somewhere in the neighbourhood. With reference to gulls generally I may add, that I found a prevailing impression in the minds of the fishermen of this coast, that the small gulls were the young of the large ones, and that the large brown (or immature birds) were "real old specimints" and parents of the great black and white ones. How far my explanations availed to correct these notions I cannot say, but they certainly received them with great doubt as to my veracity.

Crested Shag (*Phalacrocorax graculus*). Numbers of these birds frequented the sand-banks on the river at low water, just after the gale I have mentioned, sitting in rows of five or six by the water's edge, like soldiers "in rifle green," making a singular contrast to the white breasts of the various gulls. Though at a distance looking as if nothing could disturb them they seemed to know exactly how near was consistent with safety, and never gave me the least chance of a shot. Specimens are, however, occasionally obtained by lying in ambuscade behind the river wall at certain spots that they chiefly frequent: these birds, like the larger gulls, left soon after the storm, and only one or two appeared afterwards, at times on the mud.

Razorbill (*Alca torda*) and Guillemot (*Uria troile*). The razorbills were very plentiful off the coast, at times appearing within a stone's throw of the beach, but generally most numerous in the early morning or on fine afternoons with a calm sea. At these times it was a pretty sight, with a good glass, to watch the various groups preening their feathers as they floated over the rippling surface of the water, stretching themselves up now and then with a flutter of their wings, or playing

that everlasting game of "heads and tails" that tries so sorely the skill and patience of the anxious sportsman. I generally found them in parties of three, consisting of two old birds and a young one, easily distinguished by its gray head, but occasionally lumps of eight or ten appeared, which separated as soon as ever chase was given. The extreme tenacity of life in these creatures, added to the great thickness of their skins and feathers, renders big shot indispensable; but even then it is doubtful when a "wobble" (the classical name applied to this species on the Devonshire coast) may be fairly considered bagged. Sometimes a successful shot turns up a fine old bird, who floats motionless on the water till the boatman pulls leisurely up to him. You lean over the side to snatch your prize, when, holloa! "Jack's alive again," and as your empty fingers close over the ripple, where his tail was last seen a gurgling croak comes back upon the ear with a sound not unlike "Walker." Lucky, indeed, if, after your consternation at such a scurvy trick, you ever get a second pop at your lively friend. Nor are they always yours though actually in hand, for I once picked one out of the water that I had just shot, and having no reason for doubting that he was what he seemed to be—quite dead—I laid him across one of the seats, on his back, by the side of the boat; I then began reloading and looking out for a fresh batch, when just as I had pointed out a likely lot to the fisherman, I heard a flutter, and on looking down was just in time to see the vanishing point of "wobble's" tail, as he left my care for ever. It is not generally difficult to obtain a first shot at these birds, but as soon as they become alarmed they commence diving most rapidly, keeping well together, coming up and going down with the most perfect precision. The longer the chase lasts the further they swim under water, coming up just to breathe, and showing at times only their beaks above water, and, as a last resource, they double back after diving and come up in quite another direction, where you least expected. At these times the shooting is anything but easy, from the violent motion of the boat, as the fisherman pulls with all his might after the birds, whilst a head and neck only presents a small mark to hit on the buoyant waves. Occasionally they dive after receiving the shot, and leave you with the impression of a decided "miss," when suddenly the bird floats up to the surface quite dead, having kept under water as long as life remained. The old birds at the end of March were in full plumage, the white line from the beak to the eye very distinct, the irides dark brown and the mouth inside rich yellow. The young birds of the previous year were still very gray on the sides of the head and round the throat, and the white line

from the eye visible, but mixed with black; the beak, however, resembled the adults, having even the white groove quite perfect. I saw but very few guillemots, or "mairs" as they call them, and those generally single birds in the river or harbour, but never got a shot at one. I certainly expected to find more of them than of the razorbills. Once or twice off the coast one of the large divers also made its appearance, a young bird, but of which species I could not make out, as it kept at a most respectful distance.

Crested Grebe (*Podiceps cristatus*). I was somewhat surprised to find these birds not only in the tranquil waters of the bay at Torquay, but also out at sea, off the coast at Teignmouth. Always associating them with the still waters of our Norfolk broads, where they remain nearly all the year round, only making towards the sea when their usual haunts are closed by the ice, I had no idea that they could accommodate themselves so closely to the habits of the more strictly marine divers. On one occasion I saw a party of three, apparently an adult pair and a young bird, having no perceptible crest. The old male was a most splendid specimen, with about the finest crest I ever saw, and as I watched him, through the glass, between the intervals of diving, the silky whiteness of his neck and breast contrasting with the rich chesnut fringe, glistened in the sun as he rose and fell on the rippling waves. I afterwards saw single birds, even in rough weather, diving into the large billows, or floating lightly over others, as much at home on the "troubled sea" as the guillemots or the razorbills. Whether it is usual or not to find this species on the Devonshire coast at this season (between March and April) I am not aware; Yarrell speaks of them as having been "seen occasionally in Devon and Cornwall," which would imply that they are not very common at any time, but certainly the mildness of the weather afforded no clew as to their motive for preferring the "sea-side" in this instance to the quiet waters of the "Teign."

Water Ouzel (*Cinclus aquaticus*). I had the pleasure of seeing this species for the first time in a wild state, being only a very rare visitant to the Eastern counties, but certainly in a locality where I least expected to meet with it. A single bird frequented the bathing cove at Torquay, where for several days I observed it flitting across the little bay, from one range of rocks to the other, flying low over the waves as they broke on the shingly beach, and perching every now and then on the huge stones that form the breakwater jutting out into the sea. I had not expected to find the water ouzel so near the coast, but certainly a more quiet, secluded spot could scarcely be found,

and the waters of the bay seemed tame in comparison with the rapid streams of the north, where, amidst the foam and splash of the torrent, are the usual haunts of the dipper.

Rock Pipit (*Anthus obscurus*). This species in Devonshire appears to take the place of the meadow pipit on the Eastern coasts, frequenting the grassy slopes by the sea, and the rocks at low water left bare by the tide. Here they flit noiselessly from one weed-covered stone to another, searching the little hollows between for insect life, or, running along by the edge of the water, dart at the sand-flies as they rise from the beach. These birds are readily distinguished from the common titlark by their larger size, and the more sombre tint of their plumage. The note is also louder, and their manner of walking struck me as peculiar, for though so plentiful in this district I watched them with much interest, being so rarely seen in Norfolk, and then chiefly in winter.

Pied Wagtail (*Motacilla Yarrellii*), Wheatears (*Sylvia œnanthe*), &c. The Denes at Teignmouth were a favourite resort for the pied wagtails, several pairs being seen at all times of the day, moving along the green, or chasing each other in rapid flights over the sand-banks to the beach below, but, although watching them very closely, I was unable to identify a single white wagtail (*M. alba*) amongst the number of the common species. On the morning of the 20th of March, a most undoubted arrival of migratory specimens appeared, the slopes in front of the sea being quite covered with them. So unusual was their appearance in such quantities, and so tame did they seem, that every one was stopping to look at them, but by the next day this flight had passed on, and only a few pairs, as usual, remained by the sea. The same thing also occurred a few days later with the first flight of wheatears, which remained for a day's rest, and then, to a bird, disappeared on their way inland to spread themselves over the country.

H. Stevenson.

Norwich, November 28, 1859.

Notes on the Queleli, a rare Bird of Sonora; the King of the Zopilotes; and Bartram's Vulture. By A. S. Taylor, Esq.*

The Queleli.—From the descriptions of three of our friends, we are placed in possession of some curious facts relating to the habits and

* Written for the 'San Francisco Herald,' and sent by the Author for publication in the 'Zoologist.'

characteristics of this rare and highly curious bird, a member of the condor or sarcoramphus family of Dumeril, which we have not been able to find described or alluded to in any of the books on Natural History in our possession; and it may be that it is a species unknown to naturalists.

An intelligent Sonoranian of Oquitoa, near Alta in Sonora, who resided in California several years, gave me the following facts, in relation to this curious bird. It inhabits particularly the Pimaria, Alta and Baja, the Papagoria, the Opataria, the Apacharia, and other Indian and little-known mountain districts of Sonora, Durango and Sinaloa to the East and South, and it is very rare even in these countries. It is called Queleli by the Papago Indians, who have a great veneration for it. Its weight is from eight to ten pounds. The beak is hard, short, and curved sharply down, its colour bright lemon, the iris of the eye pink or light red. On the crown of the head it has a fleshy caruncle, or comb, of black and white, which forms like a cravat, and also hangs on both sides of the head, and which is bare of feathers; the skin of the chops or cheeks is mottled black and white; the neck-feathers are black, with a ring of white feathers below forming a ruff, like a circle of swan's down on a lady's tippet; the back is striped black and white lengthwise of the bird; the upper part of the wings is also striped with black and white; the ends of the wing-feathers are tipped with white; the tail-feathers are striped and tipped the same as the wings; the under surface of the wings is barred also in the same way; the wings measure from 12 to 18 inches long from the joint at the body. The chest, belly and lower part of body are of lemon-coloured feathers; the legs and feet are also yellow, with four toes armed with black and very sharp claws.

The female bird is of smaller size, the colour similar but more subdued. The eggs are reddish and mottled black, sharply peaked, and weigh about two ounces. They make their nests in the highest trees of the mountain sides and peaks, and always go in couples, never in flocks. When they rise from the ground they make a whirring, rushing noise, moving very fast; they are very rare throughout Sonora, as my informant states, and extremely difficult to take. They raise two young in a year, generally male and female. When young their plumage is yellow, black and white. The full-grown birds are about the size of the common Turkey buzzard. In six months the young begin to fly. The females lay their eggs in the spring. They are seen at times turning over and over in the air in quick motions, from whence the Indians have a superstition that they breed in the

air. The Indians also say that the male bird breaks the egg to let the chick out.

They eat dead animals or those recently killed. The tongue is red, and has a spinous process on its under part, shaped like a pen, and said by the Indians to be used in making a loud whirring noise when it rises from the ground. They eat very fast, and all other carnivorous birds hold them in great fear. My informant aforesaid, who has travelled throughout Sonora and seen them in different localities, says they are most abundant in the Alta Pimeria, of which the Gadsden purchase forms a portion.

But the most singular part of the bird, and that which makes it such a wonder among the Sonoranians, is that it appears to have four wings, or appendages, used for assisting flight, on each side of its body; that is, a pair of wings like those of other birds, each with three assistant wings or winglets joined to the main one, and folding under the main ones, and next to the body.

An officer of the Revenue Service assured me, on two occasions, that he had seen this bird at Guaymas in Sonora, in 1854, in possession of Capt. Spence, Captain of the Port, that they were so scarce as to sell for fifty dollars a piece, and that, according to his recollection, my Sonoranian informant was in the main correct in his description of it. This latter informant was well known to me; he lived several years around Monterey, and left for Sonora in the latter part of 1857; his description was taken down by myself, at Monterey, in November and December, 1855, and, being confirmed by the officer before mentioned, who is an old acquaintance of mine, it seems to me there can be no doubt that the bird is a *rara avis* unknown to naturalists.

A gentleman now living in Monterey, who is, like the writer, an amateur naturalist, assures me also that, in a voyage he made to Guaymas and the California-Gulf ports in the summer of 1854, he saw a bird of this kind in Guaymas, most likely the same one, in the possession of Captain Spence or some other foreigner there, but that it afterwards died, and, from its extreme rarity and beauty, was considered a great loss, as it was brought from far in the interior.

According to this informant, who read, a few days ago, the notes I had taken down in 1855, he can only remember the size, colour of the cheeks, and the singularity of the wings. The size is the same as I have stated, but the colour of the cheeks (which he thinks are feathered) was yellow. The number of the winglets was three on each side of the bird, and not four, as stated in my memoranda.

One of the winglets is attached to the main wing on the outside by a flexible joint, and the other winglet is attached to the under part of the main wing in the same manner. These extra wings are only seen when the bird opens its wings in rising, or when at a short distance from the ground; but when standing at rest they are folded so as not to be noticed. The under winglet, when flying, is extended beyond the main wing; but the upper winglet is smaller, more compact, and closer to the body; both of these winglets being opposite to the wing-joint of the body at the base of the neck. The bird he represents is as beautiful as it is curious, and, as all three informants state, much sought after and highly prized in Sonora. It seems that only two or three specimens have ever been known to be captured, which may account for its not being mentioned in any of the books on hand in California.

This bird may be taken by some readers as only a description of the Mexican small vulture, called the king of the zopilotes; or the small condors of the Laplata pampas, called the king of the vultures, or king of the condors; or the Sarcoramphus sacer, or sacred vulture of Bartram. But, from the descriptions of these rare birds, which we give herewith for ready comparison, it will be seen that there are many points of material difference between them.

King of the Zopilotes. "The Cozcaquahtl is called, by the Mexicans of the city and valley of Mexico, the king of the zopilotes, or king of the Turkey buzzards; and they say that when these two species happen to meet together over the same carrion, the zopilote which is found in all the climates of Mexico, never begins to eat till the other bird has tasted it. They are both mute, and sometimes fly together. The king of the zopilotes is larger than the zopilote, has a red head and red feet, with a beak of a deep red colour, except towards its extremity, which is white; it is much scarcer than the zopilote, and is peculiar to the warm climates alone. Its feathers are brown, except upon the neck and parts about the breast, which are of a reddish black. The wings are of an ash-colour upon the inside, and upon the outside are variegated with black and tawny. Bomare says that the Aura (pronounced Owra, for the Turkey buzzard, by the Mexicans) is the Cosquath of New Spain, and the Tropilot of the Indians; so that Cozcaquahtl and Tropolotl are both native Mexican-Indian names for two different birds. But the bird which now goes by the name of the king of the zopilotes, in New Spain, seems different from the one which we are describing. This is a strong bird, of the size of a common eagle, with stately air, strong claws, fine

piercing eyes, and a beautiful black, white and tawny plumage. It is particularly remarkable for a certain scarlet-coloured, fleshy substance, which surrounds its neck like a collar, and comes over its head in the form of a little crown.

"I had this description of the bird from a person of knowledge and veracity, who assures me that he has seen three different individuals of this species, and particularly that one which was sent from Mexico in 1750, to the Catholic king, Ferdinand the Sixth. He further informs me that there was a genuine drawing of this bird published in a work called the 'American Gazetteer.' The Mexican name Cozcaquahtl, which means 'king eagle,' is certainly more applicable to this bird than to the other. The figure in our Plate (p. 74) is copied from that of the 'American Gazetteer." (See Clavijero's 'History of Mexico,' 1790, Cullen's translation, Philadelphia, 1804, vol. i. p. 65, and notes).

On showing the engraving in Clavijero's volume to my Sonoranian friend, he readily recognized it as the king of the zopilotes, which he well knew; but it was not the Quilele condor, or vulture of Sonora.

The King of the Vultures, or King of the Condors of the Pampas (*V. Papa of Linneus*). "This bird is larger than a male turkey; the skin of the head rises from the base of the bill, and is of an orange colour, from whence it stretches on each side of its head, from thence it proceeds like an indented comb, and falls on either side according to the motion of the head; the eyes are surrounded by a red skin of a scarlet colour, and the iris has the colour and lustre of pearl. The head and neck are without feathers; they are covered with a flesh-coloured skin on the upper part, a fine scarlet behind the head, and a duskier-coloured skin before; further down, behind the head, rises a little tuft of black down, from whence issues, and extends beneath the throat on each side, a wrinkled skin of a brownish colour mixed with blue, and reddish behind; below, upon the naked part of the neck, is a collar, formed of soft, longish feathers, of a deep ash colour, which surround the neck and cover the breast before. Into this collar the bird sometimes withdraws its whole neck, and sometimes a part of its head; so that it looks as if it had withdrawn the neck from the body. These features of beauty suffice to distinguish this bird from others of the vulture tribe. With all its beauty, its food is the same as the others,—offal, rats, lizards and serpents,—and the flesh is entirely uneatable." (See Oliver Goldsmith's 'Animated Nature,' vol. ii. p. 44, and fig. 1 of Plate 16, Whitlaw's Glasgow edition, 1840).

The Sarcoramphus sacer of Bartram, or Sacred Vulture. "This bird was described by John Bartram, in his 'Travels in the Carolinas and Florida' (Philadelphia, 1791), as abundant in Florida then, but has not been observed or identified anywhere since his time. This has tended to throw a doubt on its existence; but recent information renders it probable that this, or at least a different one from the vultures just described, is found about Lake Okechobee, in Southern Florida, where it is called the king buzzard. The verification of this statement by actual specimens would be one of the most important discoveries yet to be made in North American Ornithology. The following is Bartram's description: — 'Bill long, and straight almost to the point, where it is hooked or bent suddenly down, and sharp; the head and neck bare of feathers nearly down to the stomach, when the feathers begin to cover the skin, and soon become long and of a soft texture, forming a ruff or tippet, in which the bird, by contracting his neck, can hide that as well as his head; the bare skin of the neck appears loose and wrinkled, and is of a bright yellow colour intermixed with coral-red; the hinder part of the neck is nearly covered with short, stiff hairs, and the skin of this part of the neck is of a deep purple colour, gradually becoming red as it approaches the yellow of the sides and fore part. The crown of the head is red; there are lobed lappets, of a reddish orange colour, which lay on the base of the upper mandible. The plumage of the bird is white or cream-colour, except the quill-feathers of the wings, and two or three rows of the coverts, which are beautiful dark brown; the tail, which is rather large and white, is tipped with this dark brown, or with black; the legs and feet are of a clear white; the eyes are encircled with a gold-coloured iris; the pupil is black.'" *Vide* Mr. John Cassin's Notes on the Raptorial Birds, in vol. ix. p. 6, of the 'Pacific Railroad Reports,' published by order of Congress (October, 1858), 1004 quarto pages, and altogether on the birds collected by the railroad and other Government expeditions since 1853. This volume, and the eighth volume of the same work on animals, were compiled by Prof. Spencer F. Baird, of the Smithsonian Institute, and are as much a high honour to the Government which provided the materials, through its laborious and intelligent military and other officers, as they redound to the eminent learning, labour, assiduity and honourable name of Baird. But in nothing is Prof. Baird more original than in his plan of these two volumes,— in the fairness, equity, and justice of acknowledging every donor, benefactor or assistant, and in the perspicuity and simplicity of the language. We believe there are no two such books on Natural

History in the world, though they seem to us susceptible of great improvements in matter and plan, like every other old or new thing. The persons who assisted Baird, both Government and otherwise, certainly are placed in a more honourable and proper light than in any work of the kind, American or European, which has come under our notice. It is certainly a model to other *savans* and writers, American and European, who have not been too often wont to make acknowledgments to California for what seemed to the uninitiated outsiders as their own original gatherings, their own original thoughts, abstracted without acknowledgment, and put in so quietly that one could hardly recognize their own brain-work or handiwork.

King of the Zopilotes, and Bartram's Vulture. — Conversing recently on these two rare, curious and costly birds, with a friend who had resided in Florida several years, he says the description by Bartram of the king buzzard, as quoted in vol. ix. of Rail. R. Reports, is correct. He has seen them several times around Lake Okinochobee, and other parts of South Florida; also in Texas on the coast, and on the frontiers near Mier; he has also seen them near Vera Cruz. They are very scary and shy, and very rare to find in Florida now, on account of the Indian wars since 1830, and the firing of ordnance and muskets; but they used to be very numerous once. Of late years they have flown off to the more unfrequented continental countries of the Gulf of Mexico, not far from the sea; and it is very rare to see more than one or two at a time. He has never noticed the female or seen the eggs.

This gentleman, after reading Bartram's account, says it is the same bird as the king of the zopilotes, depicted in Cullen's 'Clavijero,' which he recognised immediately; and that if there is any difference in feathers, appearance or size, it must be owing to the age or sex of the bird, the season of the year, or changes in its plumage. He has seen the bird also on the west coast of Mexico, and quite numerous around Manzanillo and Colima. At Colima he has had them offered to him for two dollars and a half a piece.

But this opinion cannot prevail against observations of the future, taken on the spot by scientific ornithologists. At any rate, this gentleman's remarks are highly valuable and suggestive. As he is a medico, as well as a great traveller by sea and land, and knows California from Shasta to San Diego, by land as well as by water, with a ten years' experience, and has made several trips along the Mexican and Central American coasts, and travelled pretty extensively in those

countries on business, his testimony is worth a great deal, though he makes no claim to being a naturalist.

Doubtless further accounts of the more rare birds and animals of North America could be found in the American and European printed books of travel and history, on the southern sections of the United States and Mexico and Central America, which have been published in England, France, Germany and the United States, since the advent of the Spanish revolutions of 1820. The old Spanish missionary writers prior to 1800 also contain valuable observations on the Natural History of Spanish America, very little known seemingly among the learned men of Europe and the United States. California has brought to new light the great value of the literary and zealous labours of the old Catholic *padres*. What would the people of California have done for provisions in 1849 and 1850 if the friars had not provided for them 500,000 head of cattle and 30,000 horses? They would have starved like Jacob's family. The priests proved the zoological, fruital and agricultural value of California for seventy years.

A. S. Taylor.

Monterey, April 7, 1859.

Notes on Birds observed in Herefordshire.—During a visit to Herefordshire in the autumn of this year I had frequent opportunities of noticing that the country abounded in many birds which are comparatively rare in other countries, although my visit was not made at the best season for ornithological observations, especially as regarded our summer residents, they having then nearly all disappeared. Amongst others, the missel thrush, called by the country people the "stretch," is met with in great numbers; indeed it appears even more common than the song thrush, though the latter is also plentiful. The ring ouzel or mountain blackbird, the rarer great gray shrike (*Lanius excubitor*) are, I was informed, tolerably numerous, but at the season of my visit they had probably migrated, as I did not see either of them. Of the larger birds, I observed hawks, jays, magpies, and last, though not least, at all events in brilliancy of colour, the gay-plumaged green woodpecker (*Picus viridis*) or "ecle," which is the name it is there known by. Rarely did I go abroad, especially on a dull, gloomy day, without hearing its merry startling laugh (believed there to prognosticate rain) ringing through the woods or in crossing the large orchards, so common in that part of the country; seeing it, cat-like, supporting itself on the trunk of an old apple-tree, peering cautiously around it from time to time, and then, on the least intimation of danger, winging its short ungainly flight, dropping and then rising as it speeds its way to some secure retreat. So wary are these birds that, although I so frequently saw them, I did not succeed in procuring a specimen, as they would not allow me to get sufficiently near them for that purpose: prompted no doubt by an instinctive knowledge that their gay appearance renders them more conspicuous than the rest of their species, they generally select an isolated tree with no cover close enough to conceal an

approach, the green and yellow of their backs contrasting vividly with the dark bark as they climb the trees in quest of their insect-food. The nuthatch (*Sitta europea*) or "French magpie," as it is there called, was also said to be abundant, but I only observed two on the same morning in an orchard adjoining the house, and should probably have overlooked them had I not been attracted by their curious note. Very fine specimens of the elegant gray wagtail (*Motacilla boarula*) as well as the common pied variety frequented the roofs of the house and outbuildings. On the banks of the "Wye" the kingfisher is seen in considerable numbers, also the common sandpiper or summer snipe, moorhens, and occasionally herons, and, as I was informed, the water ouzel (*Cinclus aquaticus*), though I did not see the latter there; I was, however, more fortunate nearer home: as I was strolling, gun in hand, early one morning in search of woodpigeons, on the elevated bank of a small stream about one hundred yards from the house and close to a miniature waterfall, I heard a wild, sweet note sounding clear above the rushing of the water and echoing back from the overhanging banks; my curiosity being aroused, determined me, if possible, to discover the songster. I accordingly descended, and by means of a rustic bridge crossed the brook: immediately on my doing so a bird flew out of the opposite bank, shooting down the stream and reminding me somewhat of the flight of the kingfisher; at first I was taken by surprise, but succeeded in shooting it, and found it to be a very beautiful specimen of this singular bird, which I had vainly endeavoured to procure on the banks of the river. As to our rarer visitors, I fear my stay was not sufficiently prolonged to give me an opportunity of observing them, nor did I succeed in obtaining any reliable information respecting their appearance.—*John Henry Belfrage; 7, New Inn, Strand.*

Ornithological Occurrences in Norfolk.—An immature male eider duck was shot at Blakeney, on the 25th of October. The feathers on the breast of this specimen exhibit the earliest state of change from the plumage of the female, each feather being barred with black and white and tipped with brown, the dark fringe partly concealing the brighter tints, giving a curiously mottled appearance. Another male, in the same state of plumage, was more recently obtained at Yarmouth. On November 11th, a fine old male of the hen harrier was killed at Ranworth, and about the same time an adult female was winged and taken alive, at Horniug, in the same neighbourhood. The latter bird, very probably the mate of the Ranworth specimen, is now in the aviary of J. H. Gurney, Esq., at Catton Park. These birds were formerly very plentiful in our marshes, but — from extensive drainage and other causes — have, with their kindred species, become more and more scarce, the adults, especially, being very rare. I had never before the pleasure of handling a recently-killed specimen of the old hen harrier in its delicate blue and white dress, although Montagu's harrier, in the same stage of plumage, occurs from time to time. A female velvet scoter was shot on November 14th, at Yarmouth, and a single specimen of the little auk was lately picked up alive in a ditch in this neighbourhood. This is the only one of these storm-driven wanderers that I have heard of this season. Peregrines, chiefly young birds, and ospreys, have been more numerous than usual on our coast during their autumnal migration; a curious light variety of the former, a young female, bearing much resemblance about the head to the "Saker falcon," was killed at Ranworth. Several fine specimens of the hawfinch have been met with in various parts of the county, and that irregular visitant in sharp winters, the Bohemian waxwing, has appeared in several instances. I have already seen four beautiful specimens from dif-

ferent districts, and others have been seen. With the exception of a solitary straggler or two, these birds have not visited us in any quantity since the winter of 1849—50, when such large numbers occurred along the whole line of our eastern coasts, as noticed in the 'Zoologist' at the time.—*H. Stevenson; Norwich, Dec.* 15, 1859.

Rare Birds at Scarborough.—I have had the following birds brought in to be preserved lately. The Egyptian goose (*Anser ægyptiacus*), a very beautiful specimen, shot out of a flock at Filey. The little gull (*Larus minutus*), in its immature plumage. The little auk (*Uria alle*), also shot at Filey. The pinkfooted goose of Bartlett (*Anser brachyrhynchus*), shot at Hunmanby.—*Alfred Roberts; King Street, Scarborough, December* 5, 1859.

Sport at the Scilly Isles.—The result of the shooting of a few friends of the Lord Proprietor of the Scilly Isles, who have been staying with him during the past month, has been the bagging of one hundred and fifty-two snipes and ninety woodcocks. Several long-eared owls, a merlin falcon, purple Tringæ, cirl buntings and brambling finches have been observed on the Islands.—*Edward Hearle Rodd; Penzance, December* 10, 1859.

Occurrence of Rare Birds at Eastbourne, Sussex.—Some rather rare birds have visited this delightful watering-place this season. On the 25th of April last a fine hoopoe (*Upupa epops*) was seen several times at Compton Place, the seat of the Hon. Mrs. Cavendish. On the 3rd of September I saw, in the flesh, a most beautiful wheatear (*Sylvia œnanthe*), pure white, with pink eyes,—in fact, a perfect albino,—which was shot by a coast-guard man here. Dartford warblers (*Sylvia provincialis*) are always to be met with in the furze growing on the hills (downs), and a short time ago I found two, one of which I shot. On the 3rd of November a particularly beautiful snow bunting (*Emberiza nivalis*) was shot close to the town, and purchased by Mr. A. Vidler, the naturalist; he also has seen two more within these few days. On the 5th of December a fine Norfolk plover, or thick-kneed bustard (*Œdicnemus crepitans*), was caught alive in a field just below my garden, and which I added to my collection. A large eagle (probably whitetailed) was seen, on the 16th instant, by a coast-guard man, at Birling Gap, sitting on the beach, and which flew to the westward: one is generally seen here in severe winters. Many goldeneyed ducks (*Anas clangula*) have been shot during this severe weather, at a place called the "Crumbles." A hawfinch (*Fringilla coccothraustes*) and brambling (*F. montifringilla*) were shot yesterday, close to my house. I saw to-day (among a flock of larks) two snow buntings; they were easily distinguished by the preponderance of white in their wings.—*J. Dutton, Consulting Ornithologist; South Street, Eastbourne, Sussex, December* 18, 1859.

Occurrence of the Great Ashcoloured Shrike (Lanius excubitor) *in Aberdeenshire.*—A most beautiful adult male specimen of the above bird was killed by a young man, near Hatton Castle, on the 28th of October last. Attention was attracted to it by an unusually large number of small birds, fluttering and screaming round the place where it was taken,—a garden hedge or enclosure. It was quite tame, at least, it suffered the young man to approach several times very near before it sought to fly. When it was shot it uttered several times a rather loud note, resembling the words "stack, stacks." It was sent to me for identification, as also for preservation,—and I must say that it was very full in flesh,—besides the one recorded by me in the 'Zoologist' for April last as being found at Drummuir, Banffshire. The stomach contained a small ball of what seemed to be the hair and bones of a mouse or mice, with portions of the elytra of beetles. These are two which have been met with this year, within, perhaps,

thirty miles of each other; and very strange indeed it would be if they were the only two that had sojourned here; yet it might be. But perhaps we shall hear more of the subject by and by, as the people in this quarter are becoming more alive to these matters than they were fifty years ago.—*Thomas Edward; Sub-curator of the Museum, Banff, December* 5, 1859.

Occurrence of the Great Ashcoloured Shrike (Lanius excubitor) *in Cambridgeshire.*—Cambridgeshire has once more been visited by a fine male specimen of the great ashcoloured shrike; it was shot at Histon, on the 5th of November; it was accompanied by a female. I have a specimen, procured about three miles from the locality named some five years since, shot on exactly the same date, *viz.* November 5.—*S. P. Saville; Panton Place, Cambridge, November* 23, 1859.

Another Occurrence of the Ashcoloured Shrike in Cambridgeshire.—Again (for the second time this season) I have the pleasure of recording the capture, by a boy, of an ashcoloured shrike, in a close near Newmarket, on the 25th of November. This locality is much further on the eastern side of the county than any in which I ever knew of its being shot before.—*Id.; December* 10, 1859.

Disappearance of Swallows and Martins.—In the December number of the 'Zoologist' (Zool. 6779), under the above heading, I see the latest date is the 24th of October. Colonel Newman asks, Is it usual for them to stay so late? I can inform him that I myself have made a similar observation, as respects their late stay this year in this locality: swallows and martins were seen as late as the 31st of October, which occurrence was unusual; they generally depart about the beginning of October; sometimes, in wet, cold autumns as early as the 15th or 20th of September.—*Id.*

Late Stay of Martins.—In the last number of the 'Zoologist' (Zool. 6779), there is a notice of the appearance of martins so late as the 24th of October. They were fully as late in the neighbourhood of Bridgwater: on the 25th several were flying around my house during a heavy rain, dashing about with great animation and apparent enjoyment. I saw a solitary one on the 29th, which was the last that I saw or heard of.—*Thomas Clark; Halesleigh, December* 15, 1859.

Occurrence of the Alpine Swift (Cypselus alpinus) *in Cornwall.*—A few weeks since a capital specimen of this rare species of swift was obtained in the parish of Mylor, near Falmouth. The bird has passed into my hands, and as far as I can judge, it is an adult bird. The whole of the upper parts are of a dull brown, and the under parts similar to the descriptions given by authors. The length from the carpal joint to the end of the quill feathers, about 8½ inches. I rather think that it is not the first instance of its occurrence in Cornwall, as Mr. R. Q. Couch has more than once told me that his father obtained a specimen at or near Looe, some years since, but whether the bird was preserved by the late Mr. Jackson, and formed a part of his collection I do not know.—*Edward Hearle Rodd; Penzance, December* 1, 1859.

Occurrence of the Black Redstart (Sylvia tithys) *and of the Whinchat* (Sylvia rubetra) *in December, near Dublin.*—Yesterday (December 13th), when on the beach, near Killiney, Co. Dublin, my attention was drawn to a bird about the size of a stonechat, which perched within three or four yards of the rock on which I was sitting. When first attracted to him, his breast was turned towards me and seemed to me much darker and sootier in colour than that of a stonechat; his manners too, differed from those of that species, and on his expanding his wings, I remarked that the white was much less in extent: while still in doubt as to his precise species,—although he reminded me much of the redstarts, as I had seen them in Devon and Kent,—a

pugnacious robin, on whose territory the stranger had intruded, approached and mobbed him, and immediately on his taking flight his fiery tail left no doubt of his genus. At the time I had no gun, and therefore was obliged to content myself with observing him for nearly three quarters of an hour, which he gave me abundant opportunity of doing, alighting at times within three feet of me, and so enabling me to note his colours; he flitted along from stone to stone, occasionally taking a flight towards the edge of the waves, and there alighting on the wet sand (the tide was advancing), he pecked for some moments among the *débris* left by each receding wave. He would then, on my too close approach, fly back to the rocks and stones which here cover the railway embankment. The robin, before alluded to, still continued pursuing and mobbing him, and, after awhile, was joined in his amusement by a well-marked specimen of the whinchat (*Sylvia rubetra*), which, in like manner, mobbed the redstart. It was rather a singular conjunction, meeting two summer birds together on a cold December day. I have before, however, seen the whinchat on these cliffs in the winter on more than one occasion, and shot a specimen here on the 12th of December, 1847. On the following day I went out to try and procure one, if not both specimens, I failed, however, in obtaining more than one tail-feather of the redstart, which, by its uniform flame-colour, left no doubt as to the species, when taken in conjunction with the white band on the wing. There appeared to be a pair of the redstarts, both males, and one much bluer in the breast than the other. Where did they come from, or what were they doing there on a cold, snowy December day? The cliffs here are covered with furze and brake, and face the south-east. Stonechats abound here at all seasons.—*J. R. Kinahan;* 51, *Stephens Green*, *Dublin*, *December* 14, 1859.

[I cannot quite agree with my friend, Dr. Kinahan, in regarding the black redstart as a summer bird. I find from thirty to forty notes of its occurrence, and they are in the proportion of six to one in the winter: it is an uncommon bird in this country.—*E. Newman*].

Occurrence of the Nutcracker (Nucifraga caryocatactes) *at Wisbech.*—A fine male specimen of this rare bird, in full plumage, was shot in a plantation at the Black Sluice, a short distance from this town, on Tuesday, the 8th of November inst. On dissection, it was found that its food, while in this country, consisted of small Coleoptera. It has been preserved for the Wisbech Museum. — *T. W. Foster; Wisbech*, *November* 16, 1859.

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*Notes on the "Mooruk."** By George Bennett, Esq.

(From the 'Proceedings of the Zoological Society').

On the 26th of October, 1858, the "Oberon" cutter of forty-eight tons arrived in Sydney, having two fine young specimens of the mooruk on board, stated to be male and female. On going on board I found them confined in a very small space, and the captain informed me he

* The mooruk (*Casuarius Bennettii*) is a newly discovered bird, allied to the cassowary.—*Edward Newman.*

had had them eight months, that he procured them soon after his arrival at New Britain for Sydney, and since that time had been trading about the islands, having these birds on board. They were fed principally on yams. I observed they were in poor condition, but healthy in appearance, and plumage in good order. They were about half the size of the specimen sent to England; but one, apparently the male bird, appeared a little larger than the other. Captain Deolin informs me that the natives capture them very young, soon after they are hatched, and rear them by hand. The natives rarely or never can capture the adult bird, as they are so very shy and difficult of approach —the native weapons being ineffectual against so rapid and wary a bird. These birds are very swift of foot, and possess great strength in the legs. On the least alarm they elevate the head, and, seeing danger, dart among the thick brush, and thread about in localities where no human being could follow them, and disappear like magic. This bird, with its strong legs and muscular thighs, has an extraordinary power of leaping; it was from this circumstance the first bird brought from New Britain was lost. From its habit of leaping, it one day made a spring on the deck, and went overboard; as it was blowing a strong breeze at the time the bird perished. In warm weather, the captain informs me, they are fond of having a bucket of salt water thrown over them, and seem to enjoy it very much. I succeeded in purchasing these birds; and Captain Slater (the present commander of the "Oberon") brought them to my house in a cab, and when placed in the yard they walked about as tame as turkeys. They approached any one that came into the yard, pecking the hand as if desirous of being fed, and were very docile. They began by pecking at a bone in the yard, probably not having tasted any meat for some time, and would not, while engaged upon it, touch some boiled potatoes which were thrown to them; indeed, we found afterwards they fed better out of a dish than from the ground—no doubt, having been accustomed early to be fed in that manner. They were as familiar as if born and bred among us for years, and did not require time to reconcile them to their new situation, but became sociable and quite at home at once. We found them next day rather too tame, or, like spoiled pets, too often in the way. One or both of them would walk into the kitchen; while one was dodging under the tables and chairs, the other would leap upon the table, keeping the cook in a state of excitement; or they would be heard chirping in the hall, or walk into the library in search of food or information, or walk up stairs, and then be quickly seen descending again, making their peculiar chirping,

whistling noise; not a door could be left open, but in they walked, familiar with all. They kept the servants constantly on the alert; if the servant went to open the door, on turning round she found a mooruk behind her, for they seldom went together, generally wandering apart from each other. If any attempt was made to turn them out by force, they would dart rapidly round the room, dodging about under the tables, chairs and sofas, and then end by squatting down under a sofa or in a corner, and it was impossible to remove the bird, except by carrying it away. On attempting this, the long, powerful, muscular legs would begin kicking and struggling, and soon get released, when it would politely walk out of its own accord. I found the best method was to entice them out, as if you had something eatable in your hand, when they would follow the direction in which you wished to lead them. They sometimes also give a smart kick to any person attempting to turn them out forcibly. The housemaid attempting to turn the bird out of one of the rooms, it gave her a kick and tore her dress whilst she was very politely driving him before her. They walk into the stable among the horses, poking their bills into the manger. When writing in my study, a chirping, whistling noise is heard; the door which was ajar is pushed open, and in walk the mooruks, who quietly pace round the room, inspecting everything, and then as peaceably go out again. If any attempt is made to turn them out, they leap and dodge about, and exhibit a wonderful rapidity of movement, which no one would suppose possible from their quiet gait and manner at other times. Even in the very tame state of these birds, I have seen sufficient of them to know that if they were loose in a wood it would be impossible to catch them, and almost as difficult to shoot them. One day, when apparently frightened at something that occurred, I saw one of them scour round the yard at a swift pace, and speedily disappear under the archway so rapidly that the eye could hardly follow it, upsetting all the poultry in its progress, as they could not get out of the way. The lower half of the stable door, about four feet high, was kept shut to prevent them going in; but this proved no obstacle, as it was easily leaped over by these birds. They never appeared to take any notice of, or be frightened at, the jabiru or gigantic crane, which was in the same yard, although that sedate, stately bird was not pleased at their intrusion. One day I remarked the jabiru spreading his long wings, and clattering his beak opposite one of the mooruks, as if in ridicule of its wingless condition. Mooruk, on the other hand, was preening its feathers and spreading out its funny little apology for wings, as if proud of displaying the stiff horny shafts, with which they were adorned.

The mooruks often throw up all their feathers, ruffling them, and then suddenly fall flat as before. They appear to have great power in raising all the feathers, and the wings are used to aid them in running, but never seem used for defence. Captain Deolin says the natives consider them, to a certain degree, sacred, and rear them as pets. He is not aware that they are used as food, but if so not generally; indeed, their shy disposition and power of rapid running, darting through the brake and bush, would almost preclude their capture. It reminds me (from the description) of the habits of the menura, or lyre bird of Australia, only it is much larger, and more powerful in its actions. The natives carry them in their arms, and are very kind to, and have a great affection for them; this will account for their domesticated state with us.

The noise of these birds, when in the yard, resembled that of the female turkey; at other times the peculiar chirping noise was accompanied by a whistling sound also. The contrast of these birds with the jabiru was very great. The mooruks were sometimes moving about, like the female turkey, in rapid motion or excitement, or, when walking quietly, always inquisitive, and poking their beaks into everything, and familiar with every person. The jabiru, on the other hand, was a perfect picture of sedate quietness, looking upon all play as injurious to his constitution or derogatory to his dignity, remaining stiff in his gait and serious in his demeanour.

Only one egg was brought, and that was partly broken; I have it in my possession. The captain informs me that they can be procured from the natives, and have generally a hole in them, about the size of a shilling, through which the contents have been extracted.

The height of the largest or male bird to the top of the back was 2 feet 2 inches; and of the female 2 feet. The height of the largest or male bird, when erect, to the top of the head, was 3 feet 2 inches; and of the female 3 feet.

Occurrence of the Gray Phalarope in Orkney.—On the 28th of November I shot a fine female specimen of the gray phalarope (*Phalaropus platyrhynchus*), in winter plumage, which I have mounted for my own collection. It is now nearly four years since I shot one here before, and only the third specimen I have seen got here, and, although constantly collecting, having seen so few, I consider them rare in Orkney.—*Joseph Dunn; Stromness, Orkney, December* 12, 1859.

Occurrence of the Little Auk in Orkney.—On the 2nd instant I was fortunate enough to shoot a few fine specimens of the little auk (*Uria alle*), in winter plumage:

as those I got were uncommonly fat, and were so active and incessantly diving, I concluded they had only newly arrived, as I am of opinion they cannot get their proper food, as, after being a short time here, I have remarked that they soon get very lean and eventually pine away. On the 5th instant I was fortunate enough to get four more, but have not seen any since.—*Id.*

Occurrence of the Glaucous Gull in Orkney.—I have seen four glaucous gulls (*Larus glaucus*), in the first year's plumage, this winter, two of which I fortunately obtained last week.—*Id.*

On some Structural Peculiarities in the Pipe Fishes.—The specimen of the Syngnathus before us is dried so as to preserve and show a very beautiful apparatus which exists under the lower jaw, and which I have not seen exhibited in any of the museum specimens that have come under my observation, nor have I seen it described. The apparatus to which I allude is what may be called a "Derrick mechanism" for enlarging the opening of the mouth, and widening the throat in the act of swallowing. As the Syngnathus is usually drawn or preserved in museums, the under line of the jaw is nearly horizontal, the under line of profile deviating little from the horizontal and showing no projection; and looked at in a vivarium the aspect of the fish is the same, and the only motion usually perceptible about the jaw is that of the singular-looking fleshy lip, which projects upwards from the extremity of the lower jaw, with its valve-like action opening slightly to admit water for respiration, and then closing to aid the action of the tubular jaw in driving the water backwards through the gills; but this limited motion would not suffice for taking in food, and hence, when the Syngnathus is about to swallow, the action of the mechanism I shall now describe is brought into play. If the dried specimen be viewed laterally a process about a quarter of an inch long is seen projecting downwards at right angles to the jaw. If instead of the lateral view this process be looked at in front, it is seen to consist of two limbs, or processes, like those of a derrick, one springing from the lower jaw on each side and uniting at an angle in the centre. From this point of junction, which appears to be ligamentary, an elastic tissue extends along the mesial line between the two sides of the lower jaw to the valve-like lip, while behind a muscular tissue exists, stretching backwards from the point between the operculum to what I believe is the os byoides. When the animal is alive the action of this mechanism is very beautiful. In the mere process of breathing this apparatus does not come into view at all. It lies quite hidden within the triangular space within the lower jaw, and fits it, and fills the space so accurately that it is very difficult to detect it, and even in the dead specimen the action of this elastic tissue keeps it so accurately fitted in its berth that it may escape a very close examination. To return, however, to the living animal,—when the Syngnathus is about to swallow it draws out by muscular action the point of this derrick, as we may call it, from its receptacle. In so doing, the point of it draws with it the ligamentary tissue extending to the lower lip until the point is drawn down so as to be at right angles with the jaw; the lower lip is necessarily drawn downwards and backwards, so as to widen the orifice of the mouth, and the profile of the fish, with the process projecting downwards, is then such as is seen in the dried specimen. At the same time as the opening of the mouth is enlarged, the capacity of the throat is widened. The long fork or process consists of

two limbs, as already described, uniting at an angle in the centre. The same muscular action which draws back the point of junction in drawing it downwards, and away from the lower jaw, widens the whole extent of the pipe-like mouth; but it does more than this, for by the same action the two lips of the bony fork, or derrick, are made to diverge, and in so doing the throat of the fish is also enlarged laterally and to double its former size. In an ordinary-sized Syngnathus, the lower jaw measures about a quarter of an inch across, when the bony fork is lying in its receptacle, but when the fork is in action and out at its full extent at right angles to the jaw, its limbs diverge until it separates the jaws to the extent of half an inch. The Syngnathus may be watched a long time in confinement before the action of this apparatus is seen. Sometimes one's patience is quite worn out watching for it; at other times the action is seen several times in a minute, and it is then beautiful to observe with the action and projection of the bony derrick the simultaneous drawing down of the lip and the widening of the long pipe-like mouth and throat. In this mechanism there is an antagonism of ligamentary and muscular action, the ligamentary elasticity drawing down and retaining the point of the bony fork in its receptacle within the angle of the jaw, the muscular action elevating it when required to aid the action of swallowing. In the dead animal the elastic action containing the bony fork is retained in its receptacle, and escapes observation. In the living animal, however, this bony process and its action may be easily demonstrated, by gently bending back the head of the fish, and raising the point of the process with the nail or a fine edge, and it will then be seen that while thus retained the mouth is opened wide and cannot be shut. Dr. Mayne has drawn my attention to an antagonism of muscular action and ligamentary elasticity in the larynx of the porpoise, similar to that which exists in the jaw mechanism in the Syngnathus. In the porpoise an elastic action keeps the larynx closed without any effort on the part of the animal until it rises to breathe at the surface, when a muscular action comes into play, and for the moment opens the larynx to permit the ingress of air. The Syngnathus is one of our most interesting fishes in a vivarium, so singular in appearance, so different from all other order of fishes, and so vivid in the contrast of its colours, and so cased in armour. It is at first very wild, and, unless the vivarium be covered, will almost certainly jump over its sides; but it soon becomes reconciled to confinement, and will, with a turn or two of its tail, support itself on any stem placed in the vivarium for its support; or, if there be two of them, they will intertwine their tails in a knot, and raise their heads and long slender bodies, side by side, towards the surface, remaining for hours in that posture. In this (the Syngnathus æquoreus) there is no pouch for the reception and protection of the young; but in the other specimen on the table (Syngnathus acus), which I beg also to present to the Society, the pouch—if it can be properly called a pouch—is well seen. It is about four inches long, resembling a bag split down one of its sides, and with the edges lying in apposition. I must beg of the Society to excuse any errors into which I may have fallen in my observations, for my acquaintance with Natural History is necessarily very limited, but it happens that I have occasionally favourable opportunities of observing the physiology and habits of some of our fishes in confinement, and such observations as I have in my power I feel obliged to this Society for receiving. — *Dr. Carrigan, addressing the Dublin Natural History Society.*

Remarks on Bombyx Quercus and the Variety B. Callunæ of Palmer.—For years past it has been the custom with northern collectors in want of this species to visit the Moors and Bogs (called "Mosses" down here) in spring, collect the larvæ on heather, and feed them on hawthorn till they assume the pupa state; what remain unchanged are thrown away. If a female is bred, she is taken to the Moors or Bogs, and the males are attracted in great numbers. Those pupæ which do not come out are kept till the following season; hence the idea gets abroad, "It is a heather-feeder, two years to come to maturity, and various months given for its appearance in the perfect state." During the last two years I have paid some attention to the subject, as regards the district of Bowdon, which is four miles from Carrington Moss. We have nothing but the Callunæ variety in this part. So far from the larva being confined to the heather, it is abundant in the lanes, feeding apparently on almost everything growing in the fences; to find them in these situations is an arduous task, compared to the heather. In the neighbourhood of the Moors, generally bleak and barren districts, where stone walls occur in lieu of fences, the heather is the only place to find them. The larva taken in spring vary in appearance and also in size: in their later stages they grow with amazing rapidity; they remain in the cocoon about a month, but others remain till the following season; some of the larvæ will continue feeding till August and September, and then go into cocoon. The moths continue on the wing from the end of June into August. I think it is very probable that the first moths which make their appearance are those which have passed the winter in the pupa state, and the constant flight of the moths is kept up into August from the present season's cocoons. In the 'Annales Ent. Soc. France, 1858,' is an elaborate communication on this subject by M. Guenée, with figures of the young larvæ of B. Quercus and B. Callunæ. The difference is then very striking, but as they get older the larvæ cannot be separated. Your readers who are interested in the subject must refer to the above, being too long for these pages. B. Callunæ is said to vary but little; it is, in fact, most variable, especially the males: some are very small, others very large; some deep chocolate, others reddish brown. I possess a male and female olive-brown; the basal tawny patch is developed in an extraordinary manner, through all gradations to none at all, the tawny bands assume all sorts of forms, sometimes very broad down to a narrow streak; others occur, but rarely, without any band at all. The female is not so liable to these extraordinary changes; it is chiefly in the tone of colour, some are very dark and others very light; the largest and darkest females are from the moors. I am indebted to Mr. E. Shepherd for four males of the southern B. Quercus with exceedingly broad tawny bands; it appears to be an uncommon variety there, and this form in B. Callunæ is rare down here. To Mr. Doubleday I am indebted for specimens of B. Quercus from Epping; these are small, and appear as if the breed was running out,—unless they migrate northwards the tribe would become extinct: he was kind enough to send me ten larvæ this season; all died in the cocoon, and believe the same fate attended his own. I was desirous of trying the experiment of taking our males with these southern females, and observing the result of their union; another season I hope to be more successful. In my opinion we have but a single species (*B. Quercus*, Lin.), whose head-quarters are the Moors and Mosses of the North. From the end of June into August the males fly with amazing vigour in search of the females. In the highly cultivated districts, like Bowdon, where fences, lanes, &c., occur, we have not the same opportunity of observing their numbers on the wing, unless we attract them with a

female. Below I give you a few extracts from my journal, showing what peculiar habits occur through all the stages.

1858.

May 12. Carrington Moss; on the heather picked up six B. Callunæ larvæ, variable in size.

July 14. Carrington Moss; find female B. Callunæ been out some time.

July 23. Four of the above larvæ in cocoon for some days past.

July 24. Carrington Moss; B. Callunæ flying in abundance; on my return home male B. Callunæ bred (larva, May 12), and two of the larvæ still feeding.

Aug. 2. Another larva in cocoon; female bred; take her to Carrington Moss to attract males; select some twenty fine specimens.

Aug. 6. Bred another female B. Callunæ.

Aug. 7. Take her to Carrington; males visit her in great abundance; find an old female on the heather depositing her eggs.

Aug. 10. Eggs of B. Callunæ, laid 24th July, hatch to day.

Leaving home at this date for three weeks, the single larva (still feeding) was turned out into the garden, and two pupæ remain over till next season.

1859.

May 9. Carrington Moss; get six or eight larvæ of B. Callunæ, various sizes, Mr. Sidebotham a few also.

May 13. Receive from Mr Doubleday ten larvæ of B. Quercus nearly full grown; ours not more than half-grown.

May 27. Most of Mr. Doubleday's larvæ in cocoon.

June 10. Carrington larvæ grown amazingly, but do not appear inclined to form cocoons.

June 11. Leave home till the 28th.

June 21. See B. Callunæ on the wing over heather at the foot of Skiddaw, Cumberland.

June 27. My people write me female B Callunæ (last year's cocoon) bred, taken to Carrington Moss, where another female was found on the heather; attract the males in great abundance, and the larvæ taken May 9th are still feeding.

July 7. Mr. Sidebotham breeds two female B. Callunæ; my larvæ, taken same time, still feeding.

July 8. Bred another female; last season's cocoon; place her in the garden at Bowdon, and attracts the males in plenty; and again the next day Mr. Sidebotham's female, kept in the coach-house at Sale, is visited by a host of males; on the same day males observed on the wing in the parish of Hale.

July 12. B. Callunæ flying abundantly at Bowdon, and a female picked up on the fence.

July 16. Carrington Moss, B. Callunæ in plenty.

July 18. Carrington Moss, B. Callunæ and a female found at Sale.

July 19. One of the Carrington larvæ (May 9th) in cocoon; the others refuse to go into cocoon.

I leave home for three weeks.—*R. S. Edleston; Bowdon, December* 7, 1859. *From the* '*Intelligencer*,' vii. 93.

Description of the Larva of Eupithecia linariata.— Short and stumpy, slightly tapering towards the head. When young bright yellow, with blackish dorsal spots. When full-fed yellowish green, with a series of large dull olive or rust-coloured dorsal spots or bars, running the whole length, and bordered on either side by a dusky olive line. Head nearly black. Belly dusky. Spiracles black. Body sprinkled with short whitish hairs, and here and there studded with black tubercles. The dorsal markings are frequently very indistinct, and sometimes wanting altogether, and the larva is one uniform yellowish green. Feeds in August and September on the flowers and seeds of the common wild snap-dragon (*Linaria vulgaris*). It is uncertain in its appearance, being one year exceedingly abundant and the next very scarce. The pupa, which is enclosed in an earthen cocoon, has the abdomen reddish yellow, tip blood red, thorax and wing cases olive. The perfect insect appears in May. In very hot seasons it is sometimes double brooded.—*H. Harpur Crewe; Medstead, Alton, Hants, November* 28, 1859.

Description of the Larva of Eupithecia subfulvata.—Long, tapering but slightly towards the head. Reddish brown, with a series of dusky olive oval dorsal spots, confluent towards the head and tail, and connected and intersected by a central dorsal line, paler in colour than the spots. Spiracular line white. Subdorsal lines black, interrupted. Back thickly studded with minute white tubercles, and less thickly with whitish hairs. Belly whitish, with a central purplish line running the whole length. Feeds in September and October on the flowers and seeds of yarrow (*Achillæa millefolium*). Pupa enclosed in an earthen cocoon; uniform, orange red, thorax and wing cases paler than abdomen. Tip of latter blood-red. Long, rather slender and tapering. Abdominal divisions deep red. Wing-cases much furrowed. The perfect insect appears in June and July. I prefer retaining the name E. subfulvata, as the foregoing description was taken from larvæ reared from eggs of this so-called variety of E. succenturiata. I shall continue to believe that the two insects are distinct species till some person breeds one from the egg of the other. I never heard that this has been done. The exhibition of a long series of varieties running one into the other proves nothing at all. It has never been my good fortune to be in a locality where E. succenturiata occurred, so that I have never been able to try the experiment. I shall feel deeply indebted to any gentleman who is in the habit of taking this insect if he will send me a few eggs or a living female.—*Id.*

Drawings of the Genus Eupithecia.—I am at present drawing and colouring from Nature, in the 'Manual,' the Genus Eupithecia. The following species I do not possess, E. consignata, E. pernotata, E. egenaria, E. pusillata,* E. irriguata, E. indigata* and E. expallidata. Those marked with a star I have only poor specimens of. If any collector would be so obliging as to lend me a specimen of these species, for the purpose above named, I should feel very much indebted to him. The utmost care shall be taken, and postage of course paid both ways.—*J. Greene; Cubley Rectory, Doveridge, Derby.*

Larva of Caradrina cubicularis in Wheat-ricks.—After reading M. Guenée's description of the habits of the larva of Apamea basilinea (Noctuelites, vol. i. p. 205) I thought I should have no difficulty in obtaining the perfect insect, which, although pronounced by the 'Manual' to be "common everywhere," is not, according to my experience, so common here. I accordingly sought among corn-ricks and on barn floors for the larvæ. In the winter of last year, and early in the spring of this year, I was present at the removal of several corn-ricks from the field to the barn, and as the

sheaves were pitched from the rick to the cart, thousands of larvæ were strewed upon the ground. Robins and other small birds, as though invited to the feast, were regaling upon them. These, however, proved to be not the larvæ of A. basilinea, but the larvæ of C. cubicularis, and up to the present time, though I have again this year sought for A. basilinea I have obtained only larvæ of C. cubicularis. Now Guenée describes the larvæ of A. basilinea as being destructive to the cereals; and in 'Noctuelites,' vol. i. p. 234, he says, "None of the larvæ of Caridrinidæ are injurious to agriculture." Surely the larvæ of C. cubicularis would not be found in such abundance among corn, unless they fed upon it. The fact of the larvæ of C. cubicularis being found in corn-ricks is noticed in 'Humphreys and Westwood's British Moths' vol i. p. 146.—*H. D'Orville; Alphington, Exeter, December* 8, 1859.

Sphinx Convolvuli Imago and Larva.—Between the 8th of August and the 24th of September, the days on which I captured the first and last, I captured in my garden twenty S. Convolvuli—the majority of them females, and many so much damaged as not to be worth setting. From one female only I obtained a single laid egg; and although I carefully extracted from the same female many more eggs, and also a large number from the others, the egg deposited was the only one that produced a larva, which hatched on the twelfth day; it was pale green, with a very black caudal horn; it fed for ten days upon Convolvulus arvensis, and died in the first moult. On the 14th of October I obtained a nearly full-grown larva of S. Convolvuli, dug up in a potato-field, and so covered with wet dirt that I infer it conceals itself under ground by day, and feeds by night. The ground was so covered with weeds that I could not trace any appearance of frass. It lived only ten days, obstinately refusing all food. The appearance of the larva was precisely as Mr. Newman describes it (Zool. 6788).—*Id.*

Foreigners, and doubtful British Species.

By Mr. Charles Miller. *

"Vanessa Antiopa, Pieris Daplidice, and Argynnis Lathonia are not resident in this country; they are casual visitors. Lathonia may probably have stronger claims than the others; but, if resident, there should be localities where it could be collected annually, like Actæon and Arion."—'*Intelligencer*,' No. 160, p. 26.

Having seen what Mr. Harding has accomplished, I think it behoves all of us, as far as we possibly can, to follow in his footsteps, and put our shoulders to the wheel of Entomology, aiding the cause not only with our out-door exploits, but, during this season of Nature's rest, pushing the subject with a few papers of a similar nature.

Really, after his parting and emphatic injunction, "Go thou and do likewise," I think an entomologist of any pretension cannot hold aloof; and therefore, wishing to be second on the list, I have jotted down a few remarks upon an important subject, which, though rather

* Read at a Meeting of the Haggerstone Entomological Society, December 8, 1859.

interesting, are, I fear, somewhat vaguely expressed. I shall entitle them "Foreigners, and doubtful British Species." It is a subject which has for some years been a source of controversy, and has recently, as you all probably know, been touched upon by Mr. Stainton, in one of his leading articles in the 'Intelligencer,' and has brought forth remarks from one or two of our best entomologists, and created some sensation amongst the many who do not put their thoughts and opinions upon paper.

I do not, in the limits of the present article, intend to put forward any new facts, but rather to take a review of the opinions already expressed, and make a few remarks upon the same. Before, however, proceeding to the immediate subject of my paper, it will perhaps be as well to ascertain the meaning of the terms with which I have prefaced it, more especially as they have in effect considerable bearing upon the matter.

As at present applied, the term "foreigners" includes indiscriminately those species which are of such rare occurrence as to leave a doubt whether they are in reality inhabitants of this country, those species which were formerly taken here, and even those which are yearly captured in some numbers. This application is both vague and incorrect; a foreigner, as I take it, being a species which does not undergo its transformations in England; and this, I think, is the true and only explanation which can be given of the term. "Doubtful British species" appears to me to be a phrase much more applicable, and capable of greater extension in its meaning, and for the following reasons. *First*, I do not consider the rarity of an insect any proof of its non-British origin; *secondly*, many species, doubtful so-called, are very likely to occur here in the larva state, from the presence of their natural food, or from the fact of their existing on allied species of plants; and *thirdly*, the non-occurrence of an insect for a series of years is no argument against its still being British. These, however, in an inverse sense, are the arguments put forward in favour of the exclusion of many species from our lists. I cannot subscribe to any of them. I will not say there are not cases where Lepidoptera of foreign origin are introduced, for instance Sphinx Carolina, an American species; but I do object to all our rarities being included in the same category.

From the foregoing remarks it will easily be seen that I am in favour of the retention of doubtful British species, and of species coming within the meaning of the term as I have explained it; and

I shall, from different examples and otherwise, endeavour to prove the correctness of my views.

In the present day Entomology is much more generally studied; the number of observers is so largely increased that rare species are continually being found, whose only claim to be considered British rests on a specimen or two "turning up," and that, too, in spots yearly visited by collectors; and before the second season is over they are distributed in all the chief cabinets throughout the kingdom. Look at Erastria Venustula, a species quite entitled, according to the theory of the abolitionists, to be considered doubtful. How many times have I myself visited Loughton, and how many other collectors have rambled over the very spot, and yet not taken it. Mr. Stephens recorded, in 1830, that only four specimens were known to be in existence; and for fifteen years the species was unnoticed, when Mr. Doubleday called attention to it; but he only succeeded in capturing two specimens. Fourteen years more elapse, and the species again appears upon the scene, I am happy to say through the instrumentality of members of the Haggerstone Entomological Society. I should be loth to believe that the insect was common only last year, and in the years in which it has appeared: I rather incline to think it is a defect in our knowledge of the habits of the species.

Take another example—Trochilium Chrysidiforme. This was long a doubtful species, Messrs. Doubleday and Stephens having erased it from their Catalogues of British Lepidoptera, the former from his 'Synonymic List,' the latter from the Museum 'Catalogue.' Time, however, which makes all plain that was before indistinct, has restored it to us, and in a very singular manner. As some of you may not have heard the particulars, I will relate them briefly. Some one has remarked that all great discoveries are the result of accident: this is certainly an example. Mr. Brewer, of Reigate, on the occasion of an excursion from that town to Dover, availed himself of the opportunity and joined the excursionists, for the purpose of collecting his favourite order Coleoptera. Whilst engaged in the search, at some point between Folkestone and Dover, he saw a pretty clear-wing, which he fortunately succeeded in incarcerating in his tobacco-box, little dreaming of the importance of his capture. By him it was presented in a casual way to Mr. Douglas, who recognised in the specimen the rejected Trochilium Chrysidiforme. Since then the species has been repeatedly taken, and, I do not doubt, will continue to be so for years to come.

One other example. Dr. Knaggs, only this year (Zool. 6733), records the capture, by himself, of eleven larvæ of Clostera anachoreta, another rejected species, or so rare as to be entitled to be put amongst the "doubtfuls" by the abolitionists. All this goes to prove that the exclusion of species is often premature.

Mr. Stainton, in opening the discussion, in the article before referred to, made choice (very unhappily as it appears) of three species to illustrate his argument — Vanessa Antiopa, Pieris Daplidice and Argynnis Lathonia. I shall say a few words upon these species, and take the expressed view of most entomologists of the present day who consider their claims as British insects undoubted. With many of the doubtful species, the fact of their being constantly taken upon the coast is put forward as an argument in favour of their foreign origin. In the case of P. Daplidice this will not hold good. Only last year a mutual friend of Mr. Biggs and myself captured one or two specimens at Cambridge; yet Cambridge is quite inland, fifty miles, as the crow flies, being the nearest point of sea-coast.

Other instances of this species being taken far inland might be cited; but the above is sufficient for the purpose. Then, again, it has been taken here from time immemorial, and in such condition as to put the idea of its being "blown over" out of the question.

The larva of this species feeds upon the wild mignonette, a thoroughly English plant; and I have heard, I think from Mr. Harding, that it has been found at Dover. If this be correct, and I see no reason to doubt it, the claims of P. Daplidice are fully made out; for a British insect is one that undergoes its transformations in this country.

V. Antiopa has even stronger claims. North, south, east, west, in all parts of England is this splendid insect occasionally taken. I have never heard of the larva being taken here; but then I believe it feeds on the tops of willows; and, persevering as entomologists are, they can hardly be expected to climb to the top of every willow tree in their neighbourhood, on the doubtful chance of finding the object of their search, and at the risk of their necks.

A. Lathonia has so often, and for so many years, been taken here, that, to my mind, it has quite as good claims as the others.

With these examples—and many of a similar kind might be brought forward—I think it is too much for any individual to take upon himself to reject our "doubtful" species. As mortals we are, providentially, short-sighted, and cannot probe the future; therefore it is impossible to say how many of these doubtful species may not be

settled in the next few years. When we get fully acquainted with the habits of species, I do not hesitate to say that we shall have no doubtful ones in our lists; for as larva-collecting gets more general it can easily be proved whether an insect passes the whole of its transformations in this country.

Many species are of such retired habits that we rarely meet with them in the perfect state, although as larvæ they may be abundant. Amongst the Tineina some species are only found in the larva state; and therefore, however rare a species may be in the perfect state, I consider we ought not to expunge it until we are satisfied that it does not breed here,—in fact, that it is a "foreigner."

If we agree with Mr. Stainton that P. Daplidice, V. Antiopa and A. Lathonia are not truly British, we must pursue the same course with many of our rarest Lepidoptera, the transformations of which we are unacquainted with: the theory will apply equally well to either case. Does any one here doubt that the common skipper (*Pamphila Sylvanus*) is a British species? Has it never struck any of you, when watching this pretty creature sporting from flower to flower, that it may have been "blown over?" Yet, ridiculous as it may seem, to carry the argument out such must be the case; for it must be borne in mind that, long as we have been accustomed to look upon P. Sylvanus as British, the discovery of the larva is yet unrecorded; and if we exclude P. Daplidice, V. Antiopa and A. Lathonia as non-residents, or in other words because they do not pass their transformations here, we should do so with P. Sylvanus, because we have no proof either way in either case.

An argument put forward by the abolitionists, in some cases, is the absence of the natural food of some species, of which the transformations are known. Now, I acknowledge that many species are exclusive in their food; but, again, there are plenty which, though not polyphagous, devour different plants, or at least feed on allied species. There is one of our rarest Micros—Hypercallia Christiernana—which feeds, on the Continent, on Polygala Chamæbuxus. This is not a British plant; but Mr. Stainton, having received some larvæ from Germany, and being short of their food-plant, tried them with an allied species, Polygala vulgaris, which they ate readily. This fact, I have no doubt, will apply to many other species of the various families of Lepidoptera.

With regard to those species which were formerly taken here, but which are now never met with, I will quote an example, Plusia illustris. This beautiful Noctua was thrown out by Mr. Doubleday, but,

singular to relate, reintroduced by Mr. Stainton. Whence can arise this perversity? P. Daplidice, V. Antiopa and A. Lathonia, species repeatedly captured, and very recently, he designates "foreigners;" whilst P. illustria, a doubtful species, not taken for years, he restores to the British list. Old authors give as a locality for this insect Salisbury Plain. Does any one search for it? I presume not; and it may occur there now for what we know to the contrary.

I shall say a few words, more immediately on the "blown-over" theory. The diurnal Lepidoptera, the Sphinges, the Bombycidæ and Noctuidæ are the only families we need take into consideration; the slightness of their structure and weakness of their flight being, to my idea, quite sufficient argument against any other species of the remaining families finding their way across the Channel.

The Sphingidæ and Bombycidæ, for the most part, are very strong of flight; and examples of the former family have been taken far out at sea, I believe hundreds of miles from land. This may be urged in favour of the foreign origin of those species occasionally taken here; but then it is very singular that only certain species should have such an erratic tendency. The Continent of Europe possessing many more species of the above families than are found here, it is also remarkable that we are not occasionally visited by other species than those which are the subject of doubt. If only from these ideas, I should feel much inclined to give all "doubtfuls" a place, until we are so well acquainted with their habits as to satisfy ourselves that they do not breed here.

There is only one other point upon which I shall touch; it is that of insects surreptitiously introduced into this country, which had their birth, lived their little day, and died under the pin of a foreign hand, in a foreign country. There can only be one expression suitable for a line of conduct descending to such trickery; it is fraudulent; yet I firmly believe it is practised by some of our more unscrupulous dealers. The insects we have at present in our lists are scarcely open to this objection, being species for the most part taken long before Entomology was made a regular trade as well as a science; and all impositions might be effectually guarded against, if the peregrinations of the insect were traced to their original source, the captor.

CHARLES MILLER.

A List of the described Longicornia of Australia.

By Francis P. Pascoe, Esq., F.L.S., &c.

The following list of the longicorn Coleoptera of Australasia has been drawn up in order to show, at one view, the extent of that portion of its insect-fauna, so far as it is known at present; and also with the hope of calling the attention of naturalists to the desirableness of such lists generally. The frequent re-issue of the Botanical Society's 'List of British Plants' and the four Catalogues of European Coleoptera, one of which has gone through eight editions, sufficiently attest their utility; and it cannot be doubted, especially in the present diffused and disjointed state of zoological and botanical literature, that an extension of this class of small books would be a great boon to the student of natural science, and particularly to the investigator of the geographical distribution of species.

There are about four hundred and twenty longicorns natives of Europe; the present list contains the names of two hundred and fifty-nine: looking to the nearly equal areas of the two regions, the more favourable climatic influences of Australia, and that our collections have been derived principally from the Adelaide, Melbourne and Sydney districts, it may be fairly assumed that we are not yet acquainted with one half; as it is, the list might have been considerably extended by the introduction of the unpublished species in our cabinets.

The localities given in this list are only such as could be fully relied on, but it is interesting to mark the wide diffusion of many of the species, notwithstanding we find that only two of them extend to New Zealand (Phoracantha dorsalis and Brachytria latebrosa), and one only (Phoracantha biguttata), if we except a doubtful Xystrocera, to New Guinea. Moreover, there are only two genera common to, and confined to, Australasia and New Zealand (Microtragus and Phlyctænodes), and two, in like manner, to Australasia and New Guinea (Meton and Symphyletes). Of course these remarks will, probably, have to be considerably modified when our knowledge becomes more extended.

PRIONIDÆ.

Notophysis lucanoides, *Serv.* Kangaroo Island.
Dorx pentamera, *Newm.*
Toxeutes arcuatus, *Newm.* Tasmania.
Sceleocantha glabricollis, *Newm.* Tasmania.
S. pilosicollis, *Hope.* Swan River.
Mallodon spinosum, *Newm.*

M. impar, *Newm.* Kangaroo Island.
M. figuratum, *Pasc.*
M. stigmosum, *Newm.*
Cnemoplites edulis, *Newm.*
C. spinicollis, *McLeay.*
C. insularis, *Hope.* Port Essington.
Macrotoma gemella, *Pasc.* Sydney.
Rhipidocerus Australasiæ, *Waterhouse.*
Tragocerus bidentatus, *Don.*
T. fasciatus, *Don.*
T. subfasciatus, *Germ.* Adelaide.
T. Spencei, *Hope.* Sydney, Adelaide.
T. lepidopterus, *Schreber.* Sydney.
Neostenus Saundersii, *Pasc.* Melbourne.
Distichocera par, *Newm.* Adelaide, Melbourne.
D. maculicollis, *Kirby.*
D. Kirbyi, *Newm.* Sydney.
D. Macleayi, *Newm.* Sydney.
D. Thomsonella, *White.*
Pœcilosoma metallicum, *Newm.* Tasmania.

CERAMBYCIDÆ.

Didymocantha obliqua, *Newm.*
D. scutellata, *Hope.* Melbourne, Sydney, Moreton Bay.
D. thoracica, *Pasc.* Moreton Bay.
D. cylindricollis, *Pasc.* Moreton Bay.
D. cretifera, *Hope.*
Piezarthrius marginellus, *Hope.* Swan River.
Trichomesia Newmanni, *Pasc.* Melbourne, Sydney.
Uracanthus triangularis, *Hope.*
U. bivitta, *Newm.* Sydney, Moreton Bay.
U. pallens, *Hope.* Tasmania.
U. fusco-cinereus, *White.* Sydney.
Scolecobrotus Westwoodii, *Hope.* Tasmania.
Stenochorus annulicornis, *Germ.* Adelaide.
Petalodes laminosus, *Newm.* Adelaide.
P. plagiatus, *White.*
Phoracantha hamata, *Newm.*
P. gigas, *Hope.*
P. lata, *Hope.*
P. robusta, *Germ.* Adelaide.
P. longipennis, *Hope.* Tasmania.
P. tricuspis, *Newm.* Sydney.
P. punctata, *Kirby.* Sydney.
P. obscura, *Don.* Sydney, Moreton Bay.
P. Mitchellii, *Hope.* Swan River.
P. semipunctata, *F.* Melbourne, Swan River.
P. quinaria, *Newm.* Adelaide, Melbourne.
P. recurva, *Newm.* Adelaide, Melbourne.
P. inscripta, *Germ.* Adelaide.
P. acanthocerus, *Hope.*
P. trimaculata, *Hope.* Swan River.
P. allapsa, *Newm.* Adelaide, Tasmania.
P. vicina, *Hope.* Port Essington.
P. undulata, *Hope.* Swan River.
P. assimilis, *Hope.* Tasmania.
P. aberrans, *Newm.*
P. senio, *Newm.* Adelaide, Melbourne.
P. unifasciata, *Hope.*
P. tunicata, *Hope.*
P. dorsalis, *McLeay.* Melbourne.
P. impavida, *Newm.*
P. gracilis, *Perroud.* Tasmania.
P. imbellis, *Newm.* Port Philip.
P. rubripes, *Bois.*
P. biguttata, *Don.* Sydney, Moreton Bay.
P. decora, *Perroud.*
Phlyctænodes pustulosa, *Newm.* Tasmania.
P. pustulata, *Hope.* Richmond River.
N. G. (Rhagiomorpha) unicolor, *Hope.* Port Essington.
Stenoderus suturalis, *Ol.* Adelaide, Melbourne, Sydney.
S. concolor, *McLeay.* Melbourne.
S. ostricilla, *Newm.*
S. maculicornis, *W. W. Saund.*
Tritocosmia Roei, *Hope.* Swan River.
T. atricilla, *Newm.*
T. Digglesii, *Pasc.* Moreton Bay.
T. rubea, *Pasc.* Moreton Bay.
T. paradoxa, *Pasc.* Melbourne.

Syllitus rectus, *Newm.* Adelaide, Melbourne.
S. grammicus, *Newm.* Adelaide, Melbourne.
S. præustus, *Newm.*
Rhagiomorpha lepturoides, *Bois.* Adelaide, Sydney.
R. ? sordida, *Newm.* Adelaide.
R. exilis, *Pasc.* Moreton Bay.
Tricheops ephippiger, *Newm.* Sydney.
Xystrocera virescens, *Newm.* Melbourne.
X. Australasiæ, *Hope.* Port Essington.
Cerambyx sericus, *Newm.* Sydney, Melbourne, Moreton Bay.
C. Australasiæ, *Hope.* Port Essington.
C. picipennis, *Germ.* Adelaide.
C. turbinaticornis, *Germ.* Adelaide, Melbourne.
C. ? lativitta, *Newm.*
C. ? subserratus, *Newm.*
Bardistus cibarius, *Newm.*
Diotima undulata, *Pasc.* Moreton Bay.
Cyclodera quadrinotata, *White.* Perry Island.
C. Angasii, *White.* Adelaide, Melbourne.
Callichroma Cinderella, *White.* "N.E. Coast."
Necydalis ? sidus, *Newm.*
N. auricomus, *Newm.*
Hesthesis variegatus, *Newm.* Sydney.
H. bizonatus, *Newm.*
H. cingulatus, *Newm.* Melbourne.
H. mœrens, *Pasc.* Sydney.
H. ferrugineus, *McLeay.* Moreton Bay.
H. ornatus, *W. W. Saund.* Hunter's River, Sydney.
Agapete carissima, *Newm.* Melbourne.
Tropis dimidiata, *Newm.* Sydney, Moreton Bay.
T. oculifera, *Newm.* Tasmania.
Bimia bicolor, *White.* Sydney, Moreton Bay.
B. femoralis, *W. W. Saund.*
Eroschema Poweri, *Pasc.* Melbourne, Moreton Bay.
Ischnotes cylindraceus, *Newm.* Adelaide.
I. Bakewellii, *Pasc.* Melbourne.
Amphirhoë decora, *Newm.* Tasmania.
Mecynopus cothurnatus, *Er.* Tasmania.
M. semivitreus, *Pasc.* Melbourne.
Psilomorpha tenuipes, *W. W. Saund.*
P. apicalis, *Pasc.* Moreton Bay.
Macrones exilis, *Newm.* Tasmania.
M. rufus, *W. W. Saund.* Hunter's River.
M. elongaticeps, *Homb. et Jacq.* Tasmania.
Enchoptera apicalis, *W. W. Saund.* Tasmania.
E. nigricornis, *W. W. Saund.* New South Wales.
Stephanops nasutus, *Shuck.* Adelaide, Moreton Bay.
Brachopsis concolor, *W. W. Saund.* Tasmania.
Hemesthocera flavilinea, *Newm.*
Ceresium ? intortum, *Newm.*
C. ? vile, *Newm.*
Obrium ibidionoides, *Pasc.* Sydney, Melbourne.
Clytus thoracicus, *Don.* Sydney, Moreton Bay.
C. Curtisii, *Lap. et Gory.*
C. D'Urvillei, *Lap. et Gory.* Moreton Bay.
C. glaucinus, *Bois.*
C. chrysoderes, *White.* Moreton Bay.
Tillomorpha mœstula, *White.* Moreton Bay.
Obrida fascialis, *White.* Melbourne.
Pseudocephalus formicides, *Newm.* Melbourne.
P. arietinus, *Newm.* Tasmania.
Callidium simillimum, *White.* Swan River.
C. Cucujus, *White.* Sydney.
C. cleroides, *White.* Melbourne.
C. catoxanthum, *White.* Adelaide.
C. erosum, *McLeay.*
C. ? artifex, *Newm.*
C. ? faber, *Newm.* Melbourne.
C. ? terebrans, *Newm.*
C. ? australe, *Bois.*
C. ? mororum, *Bois.*
C. ? funestum, *Bois.*

Callidiopis scutellaris, *F.* Melbourne.
C. præcox, *Er.* Tasmania, Melbourne, Sydney.
C. signifera, *Newm.* Tasmania, Melbourne.
Phacodes obscurus, *F.* Tasmania, Melbourne, Swan River.
P. personatus, *Er.* Tasmania, Melbourne.
P. Essingtoni, *Hope.* Port Essington.
P. Mossmanni, *Newm.* South Australia, Moreton Bay.
N. G. (Rhagiomorpha) plagiata, *Hope.* Port Essington.
Sophron inornatum, *Newm.* Melbourne.
Omotes cucujides, *Newm.* Melbourne.
O. punctissima, *Newm.* South Australia.
O. erosicollis, *Pasc.* Melbourne.
Pempsamacra dispersa, *Newm.* Adelaide, Melbourne.
P. tillides, *Newm.*
P. pygmæa, *Newm.* Adelaide, Melbourne.
P. vestita, *Pasc.* Melbourne.
Tessaromma undatum, *Newm.* Adelaide, Melbourne, Sydney, Moreton Bay.
Brachytria gulosa, *Newm.* Tasmania, Melbourne, Moreton Bay.
B. latebrosa, *Newm.* Melbourne, Kangaroo Island, Swan River.
B. pulcherrima, *Pasc.* Moreton Bay.
Pytheus jugosus, *Newm.* Sydney.
Telocera Wollastoni, *White.* Sydney.
Eburophora octoguttata, *White.* Melbourne.
Temnosternus planiusculus, *White.* Moreton Bay.
T. dissimilis, *Pasc.* Moreton Bay.
Enicodes Fichtelii, *Schreb.* Australia? (New Caledonia?).

LAMIIDÆ.

Hebecerus australis, *Bois.* Adelaide, Melbourne.
H. marginicollis, *Bois.* Melbourne.
H. crocogaster, *Dup.* Melbourne.
H. sparsus, *Reiche.* Swan River.
H. plumula, *Newm.* Tasmania, Melbourne.
H. lineola, *Newm.*
H. fuscicornis, *Germ.* Adelaide.
H. varicornis, *Germ.* Adelaide.
Pentacosmia scoparia, *Newm.* Melbourne, Moreton Bay.
Prosophus hollandicus, *Bois.*
Dysthæta anomala, *Pasc.* Moreton Bay.
Platymopsis obliqua, *Don.* Moreton Bay.
P. tuberculata, *Hope.* Port Essington.
P. armatula, *White.* N. Australia.
Symphyletes pedicornis, *F.* Sydney.
S. Solandri, *F.* Sydney.
S. puberea, *Bois.* Melbourne.
S. nodosa, *Newm.* Sydney, Moreton Bay.
S. humeralis, *White.*
S. subtuberculata, *White.*
S. maculicornis, *Pasc.* Swan River.
S. sodalis, *Pasc.* Moreton Bay.
S. cinnamomea, *Pasc.* Moreton Bay.
S. albocincta, *Don.* Sydney, Moreton Bay.
S. lateralis, *Pasc.* Swan River.
S. nigrovirens, *Don.* Sydney, Moreton Bay.
S. collaris, *Don.* "Botany Bay."
Rhytiphora porphyrea, *Don.* Sydney, Moreton Bay.
R. polymita, *Pasc.* Moreton Bay.
R. piperita, *Hope.* Port Essington.
R. caprina, *Newm.*
R. mixta, *Newm.*
R. cretata, *Pasc.* Moreton Bay.
Nyphona Bakewellii, *Pasc.* Moreton Bay.
Penthea vermiculata, *Don.* Sydney, Moreton Bay.
P. Saundersii, *Pasc.* Swan River.
P. pardalis, *Newm.* Moreton Bay.
P. granulosa, *Guér.* Sydney.
P. Sannio, *Newm.*
Callipyrga turrita, *Newm.* Moreton Bay.
Batocera rubus, *F.*
Monohammus lototephrus, *Bois.* Moreton Bay.
M. desperatus, *Thoms.*
M. argentatus, *Hope.*

M. sericeus, *D'Urv.* Melbourne.
M. mixtus, *Hope.*
M. togatus, *Perroud.*
M. fistulator, *Germ.* Sydney.
Meton Digglesii, *Pasc.* Moreton Bay.
Zygocera pruinosa, *McLeay.* Sydney, Moreton Bay.
Z. Macleayi, *Pasc.* Sydney.
Z. pentheoides, *Pasc.* Swan River.
Z. canosa, *Er.* Tasmania.
Z. bifasciata, *Pasc.*
Z. plumifera, *Pasc.* Moreton Bay.
Z. pumila, *Pasc.* Moreton Bay.
Z.? barbicornis, *Pasc.*
Olenocamptus bilobus, *F.*
Athemistus rugosulus, *Guér.* Sydney.
Microtragus amycteroides, *Pasc.* Moreton Bay.
Praonetha porosa, *Fald.* (Symphyletes?)
Notolophia bigibbera, *Newm.*
N. dispersa, *Pasc.* N. Australia.
Apomecyna nigrita, *Pasc.* N. Australia.
Ropira exorentroides, *Pasc.* Moreton Bay.
Hathlia grammica, *Pasc.* N. Australia?
H. lateralis, *Hope.* Port Essington.
H. murina, *Pasc.* N. Australia.
H. lineella, *Hope.* Port Essington.
H. lacteola, *Hope.* Port Essington.
H. quadrilineata, *Hope.* Port Essington.
H. melanocephala, *Hope.* Pt. Essington.
Anæsthetis lepida, *Germ.* Adelaide.
Illæna exilis, *Er.* Tasmania.
Saperda paulla, *Germ.* Adelaide, Melbourne, Sydney, Moreton Bay.
S. funesta, *Pasc.* Melbourne.
Cylindrodema dira, *Newm.* Moreton Bay.
Skeletodes tetrops, *Newm.*

FRANCIS P. PASCOE.

December, 1859.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

November 7, 1859.—Dr. GRAY, President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'Proceedings of the Literary and Philosophical Society of Liverpool,' No. 13; presented by the Society. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1858, Nos. 2, 3 and 4; 1859, No. 1; by the Society. 'Farm Insects,' Part 6; by the Author, John Curtis, Esq., F.L.S. 'The Zoologist' for November; by the Editor. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part 18—Pyralides; by the Author, Francis Walker, Esq., F.L.S. 'The Journal of the Society of Arts' for October; by the Society. 'The Athenæum' for September; by the Editor. 'The Literary Gazette' for October; by the Editor. 'Catalogus Hemipterorum, Herausgegeben von dem Entomologischen Verein zu Stettin;' 'Stettiner Entomologische Zeitung,' Nos. 7—9; by the Entomological Society of Stettin. 'The Entomologist's Weekly Intelligencer,' Vol. vi. and Nos. 158—162; by H. T. Stainton, Esq.

Election of a Subscriber.

E. C. Rye, Esq., of King's Road, Chelsea, was balloted for, and elected a Subscriber to the Society.

Exhibitions.

Mr. Waterhouse exhibited, on the part of Dr. Power, two new British species of Coleoptera, viz., Donacia obscura of Gyllenhal, Lacordaire, &c., determined by Mr. Waterhouse; and Philonthus fuscus, *Gravenh.*, determined by Dr. Power. The Donacia was sent to Dr. Power by Mr. Somerville, of Glasgow; it is most nearly allied to D. Lemnæ, but is of an uniform bronze, inclining to lead-colour, has the posterior thighs more strongly dentate; the tarsi longer; the third joint relatively rather longer, the punctures of the striæ of elytra finer; the form of the hinder tibiæ also differs, &c. Of the Philonthus there are two specimens, one taken at Shirley and the other at Merton, in July of the present year.

Mr. Waterhouse then exhibited from his own collection:—

1. A specimen of Philonthus fuscus, *Grav.*, taken by him at Southend, at the beginning of September, 1858; it differs somewhat from Dr. Power's specimens (which have the thorax black, inclining to pitchy behind), in having the thorax red, with the fore-half pitchy; this, it would appear from the descriptions, is the more common colour of the part in question. In all the specimens exhibited the elytra are red, with the apex pitchy. Mr. Waterhouse added that Mr. Douglas has also taken this insect.

2. Tachinus laticollis, *Grav.*, *Kraatz*. Mr. Waterhouse stated that he is indebted to Mr. Constantine for a pair of this insect, which, according to Mr. Constantine, is not uncommon near Blackburn, in Lancashire. He had long searched for this insect in vain, both in the neighbourhood of London and in the New Forest, suspecting, from its range on the Continent, that it would be found here. By Erichson it is regarded as a variety of Tachinus marginellus, but it appears to Mr. Waterhouse that Dr. Kraatz is justified in again separating it as a species. Mr. Constantine, who takes both insects, states that he readily distinguishes them.

3. Tomoxia bucephala, *Costa*, *Mulsant.* = Mordella fasciata, *Payk.*, *Gyll.* Mr. Waterhouse has seen this insect mixed with specimens of the Mordella fasciata, *Fab.*, in several of the London collections. The Tomoxia is distinguished by differences in the structure of the antennæ and by differences in the relative length of the intermediate tibiæ and tarsi; but the most obvious distinction is in the large size and nearly square form of the scutellum, which is emarginate behind. In Mordella the scutellum is small and triangular.

4. Byturus fumatus, *Linn.* Like the preceding, seems to be confounded with a nearly allied species. It differs from M. tomentosus in having the elytra more elongate and the eye much larger; the antennæ also are inserted close to the anterior angle of the eye, whilst in M. tomentosus they are somewhat remote from that organ.

Tenebrio Molitor, specimens having deformities produced by injuries received by the larvæ. One specimen has the thorax shorter and broader than usual, and corresponds most closely with the insect upon which Mr. Stephens founds his Tenebrio laticollis; this type-specimen is evidently deformed. One specimen, exhibited by Mr. Waterhouse, had not the full number of joints to the antennæ, and the joints

forming the club were much deformed, and more or less anchylosed. A second specimen was remarkable only for having one of the hind legs much smaller than the other.

Mr. Stevens exhibited a box of Coleoptera, chiefly Geodephaga, taken in the neighbourhood of Rio, by Mr. Squire.

Mr. Syme exhibited a beautiful drawing of the larva of Sphinx Convolvuli, drawn from Nature by Mrs. Syme; he also exhibited the following Lepidoptera, taken during the past season on the South Coast, viz., Leucania vitellina, Heliothis armigera, Ennomos fuscantaria and Phibalapteryx gemmaria.

Mr. Bond exhibited a fine Phycis, new to this country, taken in Dorsetshire by the Rev. Mr. Green; and a specimen of Ancylocheira fasciata, *Fab.*, found alive in Oxford Street, in July last.

Mr. Janson exhibited a specimen of Hydrochus carinatus, *Germar*, a species new to the British list, one of two taken by Mr. T. P. Dossetor, at the beginning of May last, in Holme Fen, Huntingdonshire; and an example of Mycetophagus quadriguttatus, *Müller* (M. pubescens, *Steph.*), found about three weeks since, by Mr. R. M'Lachlan, in a fungus on an oak, near Beckenham, Kent, and remarked that the present individual, one in the cabinet of the late Mr. Stephens, from the neighbourhood of Portsmouth, and one taken by Mr. Waterhouse, in the corridor of the Crystal Palace, at Sydenham, in April, were the only indigenous examples of this species he had yet seen.

Mr. Stainton exhibited some specimens of Micro-Lepidoptera, collected in South Africa by Mr. Trimen, amongst which was a beautiful Neurophora, which, unlike the known species of that genus, was adorned with elegant markings; some specimens of the genus Coleophora, though in bad condition, were interesting as the first extra-European examples of that genus which had been met with.

Mr. Stainton also exhibited, on behalf of Mr. Birks, of York, a specimen of Anchocelis rufina, with an expanded tuft of hairs inserted beneath the abdomen, on the side of the third segment; a similar brush had existed on the opposite side, but had become detached whilst being microscopically examined. Mr. Stainton said it had been suggested that this was a peculiarity of the male A. rufina, and Mr. McLachlan remarked that he had noticed it in other specimens.

Mr. Trimen exhibited some apparently nondescript Coleoptera and Lepidoptera, from South Africa.

Dr. Allchin exhibited an example of Luperina Dumerilii, taken at Brighton on the 26th September last.

Mr. Pascoe exhibited some longicorn beetles sent from Batchian by Mr. A. R. Wallace, and furnished the following characters of two of the species:—

CERAMBYX AUREIPENNIS.

C. ater; prothorace elongato, mutico, antice angustato, disco tuberculis tribus nitidis; elytris sericeo-aurantiacis; antennis corpore brevioribus. Long. 8 lin. Batchian.

TMESISTERNUS LOTOR.

T. oblongo-ovatus, fulvo-brunneus; capite, prothorace, elytris plagis tribus anticis, fascia post-mediana, maculisque apicalibus flavo-griseis; geniculis nigris. Long. 9 lin. Batchian.

Mr. G. Wailes communicated the following :—

Rhododendrons and their Enemies.

" Mr. Noble's communication, as to the destruction done to his Rhododendrons, reminds me of the doings of the larva of Mamestra Brassicæ amongst mine. Many years ago when the variety was scarce in gardens, these larvæ nearly ate up the whole of the young foliage of a plant of Rhododendron caucasicum album in a very few days, and on detecting the mischief I picked off some dozens of them. Since that time I have occasionally seen marks of their handiwork on the lower leaves of R. ponticum, especially where the branches swept the surface of the turf. This year they have flown at nobler game, and made sad havoc in a house which I have devoted to the growing of the Sikhim and Bhootan species. My collection of these fine plants wants only some three or four to include in it all the introduced species, and consists of more than a hundred plants. I mention this to show that the larvæ had full choice of food before them, whilst their attacks have been confined to the following,—glaucum, barbatum, Maddeni, Hookeri, Windsori and Jenkinsi, and of these the plants were scattered about in different parts of the house, intermingled with the other sorts. I need hardly add that the mischief was done at night, and evidently by larvæ of nearly full growth, as may be seen by the leaves I enclose, and, as I found to be the case, when I managed to capture the offenders. My impression is that a female moth had gained access by the open windows, and had deposited her eggs on some other plants in the house, and I noticed that some young Chinese primroses, &c., had their leaves partially eaten, which I concluded was the work of small slugs, and that it was not till other food failed, or the larvæ had acquired a taste for roaming, that they had recourse to the Rhododendrons. I have also observed that the larva of some Tortrix attacks and twists up the small leaves which terminate the growth of such species as R. Dalhousiæ, Edgworthii and formosum, but have not yet succeeded in rearing the species. The damage is very trifling, as they don't appear to meddle with the dormant buds.

" Another curious circumstance connected with these plants I have noticed as regards the habits of what is termed " the white scale," a species of Aspidiotus. This pest, as is well known to all plant growers, confines its attacks almost exclusively to the under sides of leaves, where it often escapes the vigilance of the gardener. In the case of one of my plants of R. Edgworthii, from a nursery, it had established itself on the upper surface along the midrib, and on the depressed veins caused in this species by the bullate areoles of its beautiful leaves. To this locality it had evidently been driven by the thick tomentum which covers the stems and under sides of the leaves, and so prevents its attaching itself to the surface of the leaf itself. Here, unfortunately for its safety, it at once strikes the eye and is readily destroyed.

" The very young leaves of several of the species have suffered also from the doings of the larvæ of one of the Tenthredinidæ, I think an Athalia, which in summer attacks almost all plants under glass, and seems a general feeder, eating the leaves half through from the under side. This I will endeavour to rear, notwithstanding the almost irresistible inclination one naturally feels to be rid of it, and to ascertain what it really is."

A paper by Mr. S. Stone was read, entitled

Facts connected with the History of a Wasp's Nest; with Observations on Ripiphorus paradoxus.

In this paper Mr. Stone shows that having taken a nest of Vespa vulgaris, and having destroyed the entire community, he placed it in an apartment near to a community of the same species, which he had previously obtained; that members of the latter community at once proceeded to feed the grubs in the stranger-nest, and to construct a covering, which they completed in about a week. At the end of three weeks Mr. Stone found, to his surprise, that the cells were occupied with eggs and pupæ in every stage of growth; and as by that time all the eggs and pupæ in the nest, when first taken, must have been either full grown and spun up, or must have become perfect wasps, it was clear that all those observed in the cells must have been deposited subsequently to the nest, having been taken.

As none of the wasps driven out of the nest when this excommunication took place were queens, all being of the ordinary size of workers, Mr. Stone concludes that the eggs were those of workers, and as the whole brood which were subsequently developed were workers, it appeared that the results went partly to confirm Dr. Ormerod's observations, published in the 'Zoologist,' last August, namely, that workers deposit eggs which produce workers; Dr. Ormerod, however, obtained males as well as workers from a nest which was deprived of its queen. The latter writer having removed a nest from a shrub, found that three or four straggling workers reconstructed the nest, and both eggs and grubs were found in it; this nest was also removed, and a third was constructed by a few workers and eggs deposited in the cells; not one wasp being observed or found in the nest. Mr. Stone also found numbers of Ripiphorus paradoxus, a beetle parasitic in nests of Vespa vulgaris: the discovery was too late in the season for Mr. Stone to observe in what manner the young grub of the beetle obtained its nourishment; one fact was, however, noticed,—that Ripiphorus is covered in the cell of the wasp, in the same way as the pupa of the latter insect, by a silken convex cap.

Mr. Smith observed that doubtless every entomologist was acquainted with the details of Professor Siebold's work on 'A True Parthenogenesis,' in which the wonderful but simple means were detailed whereby the eggs of the queen bee were rendered capable of producing fertile females and workers; and, having read Dr. Ormerod's highly interesting paper on the Vespidæ (Zool. 6641), in which the author apparently proves that worker wasps can and do deposit eggs which develope workers and also males, and having heard in Mr. Stone's paper a strong corroborative case described, he naturally was led to ask the question,—Is the wasp, then, differently organized to the honey-bee? This question he was not in a position to answer.

It did appear, as a thing proved, that worker wasps, without a possibility of copulation, were capable of depositing eggs, and that those eggs developed both workers and males. That no copulation could have taken place was proved by the fact that not a single male was developed until six weeks later in the season. Another question forced itself upon his mind, as to whether parthenogenesis, as detailed by Siebold in reference to impregnation, applied equally to the social Vespidæ as to the social honey-bee; in fact, was it a general law applying to all social hymenopterous insects? The details before the Meeting appeared to give an answer in the negative.

Mr. Smith further observed that, for his own part, he could not, as the question stood, but think that there had been some defective observation, and that further and more close attention to the subject might possibly prove this to have been the case. Dr. Ormerod got over the difficulty by supposing some of the small queens—or large workers, as they in fact are—hybernated throughout the winter, being, like the queens, impregnated the previous season; but to this Mr. Smith could not assent; it was contrary to the observations of all previous observers. He had himself found, during his researches the last twenty years, great numbers of hybernating wasps, but all had been the large queens: he had never known of a single worker having been thus discovered. If worker wasps hybernated, and were capable of continuing their kind, whence any necessity for queen-wasps at all?—*E. S.*

Notes on the Mountain Birds of Jamaica.

By W. Osburn, Esq.*

"Dover, Metcalfe, Jamaica,
November 29, 1859.

"My dear Sir,—The notes I proposed sending you related to bats—not, I am sorry to say, to the 'Dolphin's Head.' I visited it during the first few months of my residence in the island. My acquaintance with its Ornithology was then only commencing, and an important engagement obliged me to hurry through my tour as rapidly as possible. I only spent a couple of nights there, and the intervening day was fully occupied in the ascent for the view. Indeed I have not a single note about birds, though I have since had reason to suppose there was much that would have repaid investigation. I noticed many remarkable plants there I have not seen elsewhere, and among others a Melastomaceous tree, with large white flowers, closely allied to Blakea trinerva (?), whose rose-coloured blossoms are so common in lofty woods; and my host pointed out to me some large trees which Mr. Purdie, the well-known botanist, when there, had assured him had never been described, for, being something of a botanist himself, he took an amusing pride as the possessor of trees Science knew nothing about. This, however, I noticed, that the white tertiary limestone extended to the top, or so far as I went, and it must therefore be by far the loftiest peak of this formation. . . . . .

"My reasons for asking you about your extracts from Dr. Robinson's MSS. were two. In the first place, we have, as I anticipated, in the mountains of the east end, another dove. I have not been able to ascend the mountain woods at this season myself, and the confusion

* Communicated by P. H. Gosse, Esq., F.R.S.

is great between 'Mountain Witch' and 'Blue Dove.' A number of Geotrygon sylvatica* were brought to me as 'Blue Doves;' the 'Mountain Witch' was then said to be quite different,—dark blue, with a red 'mouth;' other negroes, on the contrary, reverse the names. But I think we shall probably find that it is another Geotrygon, which you heard of as the 'Blue Partridge.' But my second reason was, that I saw a note in the 'Transactions of the Jamaica Society of Arts,' enquiring after the volumes, accompanied by a statement that on the dissolution of the 'Jamaica Society,' they were handed over to Dr. Macfadyen to be presented to the old Doctor's College library—Glasgow, I think. Dr. Macfadyen soon after died, and these valuable notes had never since been heard of. I am afraid the old Doctor is a lost classic; all we shall ever know of him is contained in your plates and quotations. . . . . .

"With regard to the Convolvuli, &c., you mention as climbing over dry-built walls in mountain districts, it may perhaps be of some interest if I mention that in the Freeman's Hall district I do not know a single instance, with one exception, of a stone wall. They are among the few architectural but very characteristic remains of slavery. To build them now is vastly beyond the means of the present proprietary, even if the labour could be got at any price; rarely more is done than just keep them in repair, and very often I have seen them used to mend the roads. Freeman's Hall was standing forest till after Emancipation, consequently the gigantic trunks of the ancient woods still lie decaying across the oldest clearings. If fences are wanted, live-hedges are resorted to, as much cheaper; so that the particular plants you mention scarcely exist there. . . . . .

"The mountains of the transition shale, as Sir H. de la Beche has termed it, here come down so close to the sea, that there is, so to speak, only room for a single estate between this and their base. This little strip of sea-bord lies extremely low, and is very badly drained, forming a chain of swamps and lagoons just behind the beach. Just here, by draining, it has been rendered fit for canes; but the water, as numerous aquatic plants show, always stands stagnant to some depth in the trenches. Over these pieces, when the mornings are bright, Acanthylis comes down (I presume from the lofty mountains behind) in larger numbers than I have ever before seen. I hear them arrive, screaming, just after daybreak, and when I get out find them busy

* Some excellent naturalists in using this name of mine, have altered "sylvatica" to "sylvaticum," as if I had been guilty of a false concord. But as τρυγὼν, a dove, is a feminine and not a neuter noun, I must protest against the alteration.—*P. H. G.*

hawking over these particular pieces. I have been unable to shoot one to ascertain what is the attraction. But I may mention that fine calm weather on the north-east coast is, I am assured, most unusual during these 'northy' months, and probably a very considerable hatch of insects, whose larvæ are aquatic, takes place during the warm bright mornings succeeding a 'north:' they remain for about a couple of hours, and then disappear for the rest of the day. But I propose reserving for my next letter some notice of the birds which frequent this north-eastern sea-bord during the winter months, and devoting the present one to a few remarks on the flight and habits of a bird an ordinary observer would not fail to remark had many striking points of resemblance to Acanthylis; I mean Chordeiles Virginianus. You will not, I hope, think it superfluous, if, as a standard of comparison, I first of all advert to a few well-known characteristics of the habits and structure of the Hirundinidæ. I have seen it stated that the unusual dilatation of the œsophagus in these birds at the point it leaves the fauces is a contrivance which serves as a crop. I do not know whether this opinion is one generally received, but I do not think it could be at all confirmed by observations on our swallows here: it is generally quite empty, even though the stomach be crammed, or sometimes there is a single insect evidently taken at the moment the bird was shot, or more rarely four or five insects, but then I remark that the whole are of one species. I have a note made at the time where this was the case in an H. euchrysea I shot after observing it some time. In this instance they were all a small species of Ichneumonidæ. Now this would look, not as if the dilated œsophagus served as a crop, but as if the interval occupied in snapping up the five insects was so short that there was not time for swallowing the first before the fifth had joined it, which can rarely be the case, except in a swarm of insects. Now I think the Naturalist of Selborne long ago made the remark that swallows may very frequently be observed to take insects so rapidly one after the other that it is evident the bird must have had both or all in its eye, so to speak, at the same time; but to accomplish this it is obvious how important it is to the bird to be able to move with a certain velocity, otherwise before he came up the relative positions of the floating points would have materially changed. With a body moving freely through a fluid this velocity could in no other way be so easily acquired or maintained as by keeping for certain distances in one direction, or by impetus, and accordingly, as is well known, the flight of swallows is very generally a swoop in a straight line, or a curve of great length, then a rapid turn

and the same manœuvres are repeated in an opposite direction. And thus we may observe in the well-known structure of the swallow the utmost care lavished in the most minute particulars that impetus may be economized in every possible way. The flatness of the crown, the puffiness of the loral and gular feathers, leaving no angles about the bill, the peculiar curve of the ventral surface, carried by the lengthening of the under tail-coverts with a clean sweep to the tail, and above all the reduction of the mass of the plumage by the diminution of the size of each feather, which have their exposed surfaces polished,—contrivances all evidently tending to the same end. What is the distance at which a swallow can see an insect we can of course only surmise, for the ray reflected from these minute points floating in the air is not perceptible to the human eye during ordinary daylight, but if the insect intercept the ray, then its vibrating gauzy wings enable us to see it at a considerable distance. On a bright, calm evening, I find, when looking towards the sun, I can see very small floating insects at ten or twelve yards. May we suppose the eye of the swallow has the same power where the ray is reflected? And further it may be remarked that, in accordance with this mode of taking prey, swallows very rarely pause in their flight or raise the wings above the plane of the back. On the contrary, the tips of the motionless extended wings are usually rather depressed (in the swifts remarkably so), or having gained the required impetus by a number of vigorous strokes, they shoot along with the wing much bent at the flexure,—a position in which it seems to offer least impediment to the onward rush, and is still available for modulating it in the most delicate manner.

"The flight of these birds was thus to be adapted to pass in succession through a certain number of floating points. To do this a certain velocity was necessary, as the points are moving in every direction. But this velocity supposes, in such circumstances, the constant acquirement of a certain amount of impetus,—a force very favourable to the bird, for it counteracts other opposing forces and greatly relieves it. Every care is therefore taken to preserve it, by structure and direction of flight. It also leaves the bird the use of its wings to modulate with great exactitude this direction in a greater degree doubtless than with the generality of birds, as we know that a ship with a certain amount of 'way' will steer best. As we have every reason to believe that a certain appreciable time is necessary for a ray of light to make a distinct impression on the organs of other animals, exactly as with our own, it follows that the rays whose direction is parallel to the course of the bird will dwell longest on the eye, and

those perpendicular to this course shortest. The objects, therefore, in front will be distinct; the lateral ones distinguished with difficulty. Without, therefore, attempting too vigorous a definition, we may say that the flight of a swallow is on the plan of a straight line or lengthened curve passing through a certain number of points; and, to accomplish this, advantage is taken of two great physical laws,—one of dynamics, that a body moving in one direction will acquire an impetus,—and the other a law of optics, that rays of light require a certain time to make a distinct impression on the retina. Now in this mode of taking living prey in the air, wonderful as is its efficacy, there is one condition absolutely necessary to its success: there must be a certain amount of light. If we reduce the light the range of the swallow's sight will be in proportion curtailed till, though he may take one insect, he will not be able, at the same time, to have his eye upon one beyond it, and will therefore feed much slower. If the light be still further reduced, the impetus, so important before, will absolutely be in the bird's way, for the range of sight will be so short that it will be carried past the insect before it has time to direct its motion so as to take it. If, on a calm evening, when the piramidigs (Chordeiles) are busy overhead, we go out and attempt to see an insect, even in the most favourable positions, it will be understood how very small an amount of light is requisite to these birds to catch an immense number of their minute prey. It becomes, therefore, very interesting to attempt to trace, as far as observation enables us, the mode in which this new condition of the bird's existence has been provided for and met.

"The increased size of the eye and gape do not need comment. This is accompanied also by a great increase in the size of the feathers, by which the bulk of the plumage, relatively to the body of the bird, is rendered much greater than with the swallow. The tail-feathers are much produced, so that though the total length of Chordeiles is half an inch more than that of Acanthylis, the real length of the body is half an inch shorter.

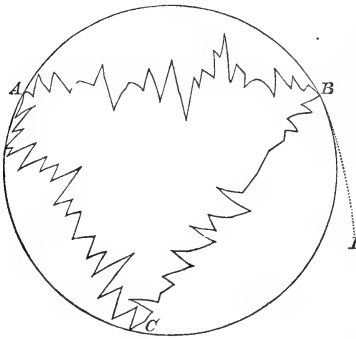
"By this arrangement it is obvious that the bird will suffer a great loss in impetus. It could not move at the rate of a swallow, without vastly greater exertion, but in exact proportion it has gained in buoyancy, and can turn, stop, move suddenly, laterally, or up or down, in a manner that would require with the latter the most vigorous muscular exertion, impossible to be long continued. The use to which the piramidig puts his new power appears to be this; the shortening of his range of sight by the diminished light is compensated by the increased number of rays that are useful to him. He is moving very

slowly, pausing often on upraised wings. The lateral and oblique rays, to the swallow indistinct, to him are clear and accurate. His increased buoyancy enables him to change his direction exactly as he pleases: hence he jerks to one side, takes an insect; jerks back again, takes another; drops down several feet, stops with a jerk and takes a third; in fine, as the light diminishes, his contortions, zigzags, jerks, swoops, irregular movements of every sort, become more and more violent, till one can scarcely believe they are performed with the perfect ease to these curious birds which their long continuance and analogy on every side assure us they must be: and as we may define the mode of hunting of the Hirundinidæ to be by straight lines of vision or a pencil of rays of great length but small angle, so that of the long-winged Caprimulgidæ is by hemispheres of vision or pencils of rays of much shorter length, but of much greater angle. And this explanation of the peculiar mode of hunting with the piramidigs seems to receive considerable confirmation from similarity of movement in the high-flying bats, by which they are so frequently joined —a species, as I believe, of Chilonycteris. The bat pursues a direct course, subject to very frequent and violent divergences laterally and downwards. If we wished to represent the waves of sound reaching the ear of the bat from a number of insects among which it was passing, it would be of course by a number of converging lines, exactly as rays of light from the same insects to the eye of a piramidig.

"Though during the spring and summer months the appearance of the piramidigs, both in mountain and lowlands, is almost constant, their manœuvres are by no means always the same. Generally a single bird first appears, uttering its harsh but not unpleasant rattle, takes a long sweep, pauses on raised wings, plunges, and sweeps on again. I have often then remarked that the flight may be represented by a series of rises and falls, the cry always commencing exactly before the bird reaches the turning points. The blowing noise is produced by one of these falls of unusual depth, which I estimate variously from fifty to a hundred and fifty feet, the sound occurring at the curve of recovery, which the bird makes with great rapidity. The original height is then gained by a rise or two higher than the succeeding falls. It is worthy of remark, as showing the difference in buoyancy of the two species, that during the great descent very considerable action of the wings is observable in Chordeiles, and an oscillation amounting to a half or quarter turn of the body in alternate directions, reminding us of 'shooting' rooks, but the same manœuvre

is performed by Acanthylis without any apparent motion of the wings —a simple downward plunge owing its rapidity to impetus and gravitation alone. Whilst the first piramidig is pursuing this erratic course its cries will be answered by a second and perhaps a third, which will gradually approach with similar movements. If they do this they will generally take a wide sweep and disappear, to be succeeded by others or return after a time. But very often a much larger number of birds may be seen steadily moving over a much more circumscribed space. I have seen them amount to as many as about thirty, but generally less. Not a sound is uttered; the birds beat over their chosen ground unceasingly; they are evidently busy feeding, and it is then some of the most remarkable points of their flight may be best observed. It was out of a flock of this sort I shot one some time after sunset, whilst they were beating over a steep narrow valley peculiar to the porphyritic conglomerate, close to the 'Bull's Head,' in Clarendon. On dissection I found the capacious stomach stuffed to protuberance with the winged portion of a community of small red ants. Though there were a very great number of insects, and all in a perfectly uninjured state, I could not detect a single individual of another species among them. It would of course not be safe to lay too much stress on two solitary examples, but it is very remarkable that in the one dissected by yourself ('Birds of Jamaica,' p. 40) the contents of the stomach should prove 'almost (if not quite)' composed of a single species of beetle, whereas in mine they were a single species of ant. The only inference which it seems possible to draw from this, as we know many species of insects are appropriate food to these birds, is, that (like Acanthylis) they are swarm-destroyers: hence their beating over circumscribed spaces, as over the steep little valley I observed, or the clump of flowering trees noted by Mr. Hill (p. 39), or, as it may be often also remarked, over a pond or water in some shape. Now, as far as I am able to observe, a swarm of insects, though often quite irregular in shape, frequently assume a spherical or ellipsoid form, the major axis vertical; and this, it is obvious, will frequently be the case where a common object of attraction, as a pond or particular tree, keeps the insects together, and still more where, as in the swarming of an immense formicary, the attraction of the insects is for each other. A section of such a swarm may then be represented by a circular line. In the instance I have above alluded to there were with Chordeiles, even at that late hour, two or three Acanthylis feeding on the same prey, and it becomes very interesting thus to compare, on the spot, the motions of the two species. On arriving at the edge of the swarm, as

is well known, the almost constant habit of the Hirundinidæ is to make a very rapid wheel, one wing much depressed, so that the whole expanse takes an oblique direction. The object of this is sufficiently obvious, *viz.* to reverse the direction of flight with the least possible exertion and the greatest possible economy of impetus. We know that in skating, and many other examples besides from theory, there is none so efficacious as this.



But the piramidig, as has been before shown, has no impetus, for he has been dashing about in every direction, and if he has had no reason for preserving it, and consequently goes the simplest way to work, by a single blow of the wings bolts round at an angle. It is this angular turn that is one of the chief distinctions between the flight of the two birds. Now let us suppose that a piramidig enters the swarm at the point A of the circle I have drawn: he zigzags, tumbles and jerks in a tolerably straight line till he arrives at B. Here he finds himself at the edge of the swarm; the insects become very scattered, so he bolts round at an angle; but it is of course of some consequence what sort of an angle this is. Suppose he did not turn enough—made the angle too obtuse—it is obvious that he would go out of the swarm to D; if the angle were too acute, that, like a swallow, he would return nearly on his former course. But this he does not do, and we can easily understand that his dashes and flutterings have created far more havoc and dismay than the rapid glide of the other: he therefore takes any other angle between these two. Let us suppose a right angle or something like it. He dashes on in the same way till he comes to the point C. Now it is plain if he made a right angle again it would take him out of the circle; he therefore makes any angle less than a right angle, and arrives at A again. Of course these angles may be constantly varied, but they will tend to equal two right angles. But, I would remark, this mode of flight is by no means constant, and can be only occasionally observed, perhaps partly from the difficulty of keeping in the mind the bird's previous courses; but it will be seen, that,—provided the requisite data be present,—

"1. That the swarm of insects is spheroid, which it will constantly tend to be for the reasons before given.

"2. That the mean of the divergences of the bird's flight equals a tolerably straight line, which we may observe it very often does, because, as has been shown, the bird's attention is directed laterally as much to one side as the other.

"3. That in making the angle at the circumference it will be such that he shall keep nearest the middle and densest portion of the swarm, but furthest from his own previous course.

"Then it is mathematically certain his flight will be in triangles, as your observant coadjutor Mr. Hill long ago remarked. It is quite impossible for us to devise a plan by which, with less loss of time, he could keep so constantly near the middle and distant from his previous flight. I need hardly add that the triangle is by no means always equilateral, as, for the sake of clearness, I have given it.

"I have never been able to ascertain anything respecting the diurnal repose of these birds; but large cotton trees have been pointed out, whence, the neighbours assured me, the piramidigs were seen to issue every evening. The universal negro answer is, 'Him no go in tree and lie down, like a galliwasp?' This would not be of much value were it not for your observation of this habit.* It seems to me that this is really the normal mode of repose, not only if we consider its efficacy, but from the peculiar formation of the foot, which, as is well known, has the short hallux placed very laterally. In the short-winged Caprimulgus I have met with, the tarsus-joint is also worn as if it were constantly rested on.

"Very faithfully yours,

"W. Osburn.

"To P. H. Gosse, Esq."

A List of the Birds of Banffshire, accompanied with Anecdotes.

By Thomas Edward.

(Continued from page 6672.)

Kingfisher (*Alcedo ispida*). Several of these sparkling gems have been taken here at different times.

* See 'Birds of Jamaica,' p. 37. I shot a night-hawk by day, resting lengthwise on a branch of a tree. See also the remarks of Mr. Bartlett on the European nightjar, in the 'Zoologist' (Zool. 445), "It is a constant habit of these birds to perch lengthwise, with the head lowest,—that is, inwards to the tree."—*P. H. G.*

Swallow (*Hirundo rustica*) and Martin (*H. riparia*). These birds are in about equal numbers. The latter generally nestles in the corners of windows, the former in barns, &c.; they also breed along the sea-shore wherever there is a cave or projecting rock suitable. White and cream-coloured varieties are sometimes met with.

Sand Martin (*H. urbica*). Wherever there is a bank of any height and not too hard, whether along the sea-shore or river-side, or a quarry or sand-hole, a colony of these active little creatures are almost sure to be met with during summer. It is surprising to see how they perforate these places, and the depth to which they will sometimes go, especially when we consider the remarkably feeble instruments they do it with—a very small and slender bill, and feet equally small and tender; but it is Nature, and all her works are wonderful harmonious, beautiful and sublime.

Swift (*Cypselus apus*). Of all our migratory species this is generally the first to depart and the last to arrive. Next to the skylark the swift appears to ascend highest in his aërial flights; and a very beautiful sight it is to see it, on a clear, still evening, hawking and gamboling about so far above the earth, and, it may be, screaming its farewell requiem to the departing sun. The swift, as I have already stated, is the first to depart, that is, generally towards the end of August or beginning of September, and returns about the middle of May; the sand martin next, or about the second or third week in September, and usually returns about the third week in April; and the swallow and house martin commonly about the first week or middle of October, and reappears about the 1st of May. There is an old nest, a sparrow's I believe, under the roof of a house here, in which a pair of swifts has bred for the last twenty-two years, and how long before I cannot tell. I do not say that they have always been the same birds; but that a pair have done so for the time stated I am quite certain.

Before I part with this interesting tribe I must become a little arithmetical. We are frequently told, and justly, of the great benefit swallows and other insect-feeders do, by the countless herds of noxious creatures which they destroy; and I will relate an instance of my own experience in this respect. Picking up a swallow which had been shot by a friend, I found that its mouth was crammed with flies, some of which were alive, and all seemed attached to the mouth by a glutinous fluid. The bird had apparently been catering for its young. Being desirous of making a further examination, I wrapped it in paper and put it in my pocket. On reaching home I opened the

paper, when a number of the flies buzzed out into my face, much to my regret; but I succeeded in counting upwards of 70, and I am quite sure there were more than 100 in all, but, in order to be under the mark, we will say there were 70. Now, it is a well-known fact that both birds assist in rearing their young. Well, say that they visit the nest every ten minutes (which is likewise under the mark), and that every time of doing so each bird conveys 70 insects; this in an hour amounts to 840; in a day of twelve hours, which is but a short day for a swallow at that season of the year, to 10,080; in a week of seven days, to 70,560; and in a fortnight, to 141,120. Now, I think this is a pretty good number for the short space of fourteen days. But if we carry the calculation a little further, by supposing that the birds rear two broods in a season, although the number is often three, we have, at the ratio at which we have been counting, a total of 282,240 insects destroyed by two birds alone in rearing their two broods. It may be said that this is nothing in comparison with the countless numbers of insects which are constantly springing into life during summer. Granted. But let it be borne in mind that I have only been speaking of a single pair of birds, and that, too, on a very limited scale, and exclusive of their own keep. If one pair of birds can do so much, what will not the thousands of swallows and other insectivorous species do? Most of the insects in the mouth of the one in question consisted of gnats, &c.

Nightjar (*Caprimulgus europæus*). Of late years this species would appear to have become more numerous, but it is still very far from being plentiful.

Ring Dove (*Columba palumbus*), or, as we have it, Cushie Doe. This bids fair to be one of the greatest pests the farmer will have to encounter with respect to his crops. They have increased amazingly within the last few years, and the damage they do is incalculable. This increase is caused by the almost total destruction of the hawk tribe, which aided greatly to thin their numbers.

Rock Dove (*C. livia*). A few pairs frequent and breed in the caverns along our coast, one at Melrose being the most noted. It is a rare case, however, to get a pure specimen, as domestic pigeons from the farms near sometimes breed with them. I have seen white specimens, as well as those of a sand-colour.

Turtle Dove (*C. turtur*). Three or four specimens of this species are said to have been seen, and some of them obtained, within the county, but whether wild ones, or individuals that had escaped, has not been ascertained.

Pheasant (*Phasianus colchicus*). Introduced, but seems to thrive very well, and is a most beautiful ornament to parks and woods. Partially pied varieties sometimes occur, and one called "silver pheasant" by most people.

Black Grouse (*Tetrao tetrix*). Sparingly. Chiefly in the higher districts.

Red Grouse (*T. exoticus*). On all our moors and hills, but not in great numbers.

Ptarmigan (*T. lagopus*). Less frequent than either of the two last. Inhabiting only the summits of our highest mountains, they are more seldom seen than those which frequent the lower ground. Like all others of the grouse tribe, they are yearly decreasing in number.

Partridge (*Perdix cinerea*). Pretty common. A very cunning and faithful mother is the female; for when she has eggs she never goes out, if time permits, without hiding them so carefully that it is almost impossible to detect their whereabouts; and if you take her by surprise, away she hobbles on one leg and a wing, trailing on the ground as if wounded. Poor creature! You pity her, she is so maimed, and follow to pick her up. Away she crawls. You near her, and, feeling sure of having her, pounce down. Ha! Ha! What a comical figure you cut! Where is the half-dead, severely-maimed bird gone? Why, flown to be sure, and left you sprawling on the ground, like a flounder just cast ashore. You rise satisfied that you have been fairly duped. It now occurs to you that you frightened the bird from her nest, and in revenge you resolve to rob her of her eggs. But what makes you look so bewildered, turning round to all the points of the compass? "Why, I don't know which way to turn to seek the nest," you exclaim. I believe you, and can tell you from experience that you have been led, by a very long, circuitous route, far away from it. Wonderful instinct, this! If it is a dog it is all the same: they will allure him just as they will you, from young as well as from eggs. But I have neglected to mention a fact, in connexion with the red grouse, which shows in a very remarkable manner how close the female will at times sit rather than expose her eggs. Wandering about the Waggle Hill one day, with my friend the late Rev. Mr. Smith, I chanced to observe a moor-fowl squatted on the ground, amongst the heather close to my feet; in fact, I stood above her before I noticed her. Being summer time I at once guessed the nature of the case. On my friend coming up I drew his attention to the bird over which I stood. "Oh," said he, "she's surely dead, Mr. Edward." "Oh, no," I said, "there are either eggs or young."

"Well," he added, "if so, it is certainly a very wonderful circumstance; but," he continued, "we shall see;" and with that he parted the heather and laid his hand on the bird. "Well," he added, "she is alive, for she is warm; but she must be wounded, and not able to rise or fly." "Oh, no," I once more said, "she has something beneath her which she is unwilling to leave;" and she allowed him to stroke her without moving, except turning her head to look at us. On my friend's dog 'Sancho' coming up and putting his nose close to her she creeped away through the bushes for some distance, and then took to flight, leaving a nest and fifteen eggs exposed to our gaze. Before leaving we carefully closed up the heather again, so as to conceal as much as possible the nest and its beauteous treasure; and I need not say that we were both delighted with what we had seen. Mr. Smith was particularly struck with the incident, as he had never seen anything of the kind before; and he often remarked, "I verily believe that I could not have credited the fact if I had not seen it myself," and always spoke of it with the greatest admiration.

Quail (*P. coturnix*). That this species is a regular visitor, I am not prepared to say; but that it is an occasional visitor and breeds here, is beyond all doubt. Nests and eggs of this species are sometimes met with in cutting grass, and are generally passed over as those of the landrail.

Golden Plover (*Charadrius pluvialis*). Where moor-fowl occur the golden plover is generally to be met with. When the hills, heaths and fields are covered with snow, the plover comes down from his alpine abode, and stays at the sea-side, where great numbers fall an easy prey to the gun of the sea-side fowler.

Dotterel (*C. morinellus*). Occasionally met with. On once asking an old keeper from the higher grounds as to where this species breeds, he replied, "On the gray slopes of the highest mountains, far above all the other birds, except the ptarmigan." I am doubtful whether it breeds with us at all.

Ringed Plover (*C. hiaticula*). These breed with us, and remain all the year round. I have found their eggs on the sand by the beach, and forty miles inland. They likewise nestle on the shingly banks and islands along our river-courses. They are known here by the names of "sea lark" and "sunny liverick."

Gray Plover (*Vanellus melanogaster*). Rather rare, and I believe only a winter visitor.

Lapwing (*V. cristatus*). On heaths and moors, and in fields, where they breed. Many of them leave us towards winter. This is another

species which will try to mislead you when searching for the eggs. Unless you are really in want of them, I would recommend you to leave them; for of all our field and heath birds the lapwing is one of the most useful in destroying destructive insects, such as Zabrus gibbus, &c.

Turnstone (*Strepsilas interpres*). An occasional visitor, generally in winter. For a curious anecdote of this species see the 'Zoologist' for 1851, p. 3077.

Sanderling (*Calidris arenaria*). A regular visitor, generally arriving in August, a few of them remaining through the winter. I have met with them, too, in summer, when their predominant colour, instead of being whitish, was a most beautiful reddish fawn. On their first arrival here they are very tame, allowing you to approach within a yard or so.

Oystercatcher (*Hæmatopus ostralegus*). Why this bird is called oystercatcher I cannot understand. Had it been named "limpet-catcher" I could have understood it. I have crawled amongst the rocks in order to see them feed, and have seen the limpet driven from its hold, and scooped out of its shell with as much apparent ease as I would have picked up a Gammaris locusta; but I have never seen it attempt to catch an oyster. On this part of the coast its food generally consists of the limpet, and very rarely of Acmæa testitudinalis. I have counted as many as forty-one of the former in the stomach of a single bird, whilst of the latter I have not met with more than three or four examples. The oystercatcher is a summer visitor with us, arriving here to breed. Now and then it may be seen during winter. Large flocks visit us some seasons, generally in September, and after remaining for a day proceed further South. "Sea piet" is the name the bird is known by here.

Heron (*Ardea cinerea*). We have some small spots where these birds breed, but which hardly deserve the name of heronries; at one time, however, they were in greater numbers. "Longlegged sandy" and "craigie" are names given to them here. I remember taking from the stomach of one a large water-rat, three middle-sized trout, and fifteen minnows. Some time ago a person belonging to this town, whilst passing through one of the streets, was startled at being hit on the head by something which had fallen from above, and which proved to be a small fish, the five-bearded rockling *Matella quinquecirrata*), apparently quite fresh. On looking up he saw nothing but a "craigie" passing over the houses, pursued by a number of crows. Of course the fish had

dropped from the heron, but he could not be persuaded that it had not dropped from the clouds.

Purple Heron (*A. purpurea*). One of these birds is said to have been shot about thirteen miles from hence. My late friend, the Rev. Mr. Smith, saw fragments of the bird some time afterwards, and believed it to be of this species.

Great White Heron (*A. egretta*). Two of these birds were observed to frequent various parts of our coast about twenty-six years ago. I am not aware of a specimen having been procured.

Bittern (*A. stellaris*). Three or four of these birds are known to have paid us a visit. One in the Banff Museum, a very pretty one, was killed near Banff about twenty-four years since; another in the moss at Park Linteen, and one or two at Balveny, twelve years ago.

Spoonbill (*Platalea leucorodia*). One of these rarities in this part of the world was raised from a ditch in a wood near here, in April, 1848, by a young naturalist of this town: he says it could easily have been shot, for he approached quite close to it, and it did not appear at all shy.

Glossy Ibis (*Ibis falcinellus*). On one occasion I perceived three of these birds about the coast here for a whole day, but could not get a shot at them; it was in the winter and during a very severe storm. I never saw any before nor since.

Curlew (*Numenius arquata*). Plentiful in certain localities along the shore in winter, retiring in spring to the alpine and subalpine districts beyond. Their note in winter is simply "Whaup," with sometimes a loud scream when suddenly come upon. In summer, however, and whilst among the moors and hills, it is more varied, being then "Poo-l-ie, poo-l-ie," then "Coor-lie, coor-lie," with a long "Wha-a-up" at the end. Though ever watchful and always on the alert for intruders, they are then not so shy as when by the seashore.

Whimbrel (*N. phæopus*). Seldom a summer passes but a whimbrel or two may be met with along the shore, and sometimes in some of our mosses. I think they breed with us. The people here consider them young curlews. They are generally very shy when here, and not easily approached. I have seen them in winter, but not often. Their call-note at once distinguishes them from the curlew, even when not seen.

Redshank (*Totanus calidris*). We have this red and long-legged gentleman rather sparingly with us, but we have him all the year. There are certain spots coastwise not much frequented, where, for

seven or eight months of the year, you will seldom if ever fail to meet a few, and when thus disturbed their wild scream sounds beautifully, and accords well with these solitary places, especially where there is a low, hollow murmuring from the ocean. This is another species, which, lapwing-like, will flap about you when in the way of their nest, and for noise they exceed them completely. They generally breed in marshy and boggy places and about the grassy margins of lochs, &c., but I have also found them amongst bents and dry sandy places by the sea-shore.

Common Sandpiper (*T. hypoleucos*). The common sandpiper (or as we have it, "Kittie-wedie," from its cry) is one of our summer birds; there is scarcely one of our streams but has its "kittie-wedies" in the season, and on the banks of which they breed. Single individuals may occasionally be met with along the shore.

Greenshank (*T. glottis*). This is a rarity with us. I have one in my possesion, out of two which were shot in the moss of Banff in 1849.

Avocet (*Recurvirostra avocetta*). More rare than the preceding; at least I know of only one having been seen near here, and it occurred in March, 1847.

Blacktailed Godwit (*Limosa melanura*). Two specimens have been taken here; one in August, 1839, and the other in December, 1840.

Bartailed Godwit (*L. rufa*). A few of these may generally be observed every autumn, either by the sea-side or in our mosses. They do not stop long with us, however, a few days at most sufficing; I suppose we have not suitable localities for them.

Ruff (*Machetes pugnax*). Rare. Three, I think, have been obtained, all birds of the year, and all in autumn.

Woodcock (*Scolopax rusticola*). Though a pair or two have been known to breed, the woodcock can hardly rank with us but as a winter visitor. In some seasons they are more numerous than in others. Does the snow effect the colouring of this species? My reason for asking this question is because, in very severe and snowy weather, I have seen many of them of a remarkably light colour; but in easy seasons, and when there were little or no storms or frost, I have never seen any of them in the same gray-like coating.

Common Snipe (*S. gallinago*). Though many of these breed and remain with us all the year, still we receive great additions annually from elsewhere, and generally towards the end of autumn; but neither during summer nor winter are they so plentiful as they were: drainage is said to be the cause.

Jack Snipe (*S. gallinula*). A winter visitor only, so far as I am aware, and by no means so numerous as the preceding. The jack snipe would appear to be a sort of solitary animal; at least I have never seen more than two of them together (of course in winter), but more commonly only one; in fact, they are nearly always singly. Unlike the others, however, I have seen them return to the same spot three times after being as often fired at.

THOMAS EDWARD.

Rare Birds recently observed in the Isle of Wight.

By A. G. MORE, Esq., F.L.S.

DURING the fourteen years which have elapsed since the Rev. C. A. Bury published in the 'Zoologist' for 1844 and 1845, his interesting notes upon Isle of Wight Ornithology, several birds of great rarity have at different times been noticed, and particulars have been obtained which have rendered more complete the history of other species previously known. It was at the suggestion of my friend Mr. Bury, and with the view of collecting under one head the more important of these observations, that the following remarks have been thrown together in the form of a supplemental contribution to our local Fauna. The three or four years last past have proved unusually productive of rare birds. For the knowledge of many of these I am indebted to the accurate observation of my friend Mr. F. Bond, to whom, as well as to Mr. Bury, my best acknowledgments are due, and from Mr. H. Rogers, the intelligent naturalist, of Freshwater, I have also received much valuable information.

Eagle. In a 'History of the Isle of Wight,' by the Rev. Richard Warner (1795), it is stated that "the eagle has been known to incubate among the crags of the Culver Cliff; the *last* known to build came there in 1780, and a countryman who descended to the nest found it to contain one solitary young bird." Warner suggests that "this eagle must have come from North Wales or from the craggy cliffs of the Western Isles, since the offspring appeared (*according to the information he could obtain*) to be of the ring-tail species, a sort very common in those places." There can, however, be little doubt that the sea eagle, besides being the more common, was the more likely of the two species to select such a locality for its nest. In support of this view I see that M'Gillivray states the nestling sea eagle to have

the tail-coverts white, and Warner had only hearsay evidence to depend upon. I am not aware that either kind of eagle has visited the island since the instances mentioned by Mr. Bury (Zool. 516).

Osprey. In the course of many years' residence at Bembridge I have only twice met with this noble bird; its visits to any part of the Isle of Wight are indeed few and far between. On the 10th of September, 1856, I saw an osprey resting upon one of the "booms" which mark the entrance to Brading Harbour; when disturbed it rose leisurely, and, after a short flight, struck at a fish in the channel, close to the village; being then descried by several gulls it was driven by them from its fishing-ground. On the 2nd of May, 1859, another osprey visited our harbour, and was observed for some time hovering above the shallow water which covers the mud-flats at high tide. The wind being rather high, I was enabled to approach sufficiently near to see the bird lowering its talons and preparing to strike each time that it descended towards the water; just then some rooks that were passing mobbed the osprey, and it flew straight away, surrounded by a cloud of its clamorous persecutors. In neither instance was the bird seen to return, though anxiously and often looked for.

Kestrel. In the crop of a young male bird, shot in May, 1859, were found several spotted newts (*Lissotriton punctatus*). Though it is well known that different kinds of reptiles are eaten by the kestrel, I do not think any writer has mentioned its preying upon the newt; and as in spring the newts do not frequent the land, it would seem that the hawk, in this instance, must have captured its prey while swimming near the surface of the water.

Buzzards. All three British species are very rare. The common buzzard can no longer be reckoned indigenous, if indeed it be not the rarest of the three. The roughlegged and honey buzzards have been lately killed at least once, and in spring and autumn buzzards of some kind are occasionally seen passing over the island at a considerable elevation. In one instance, a buzzard thus observed at Bembridge was followed and buffeted by two smaller birds resembling sparrow-hawks.

Harriers are very rarely met with, and it is believed that the hen harrier no longer breeds in the island. A single example of the marsh harrier, obtained at Freshwater in May or June, 1855, came under the notice of Mr. F. Bond. Of Montagu's harrier I have lately examined an adult male specimen, belonging to Mr. Wavell, of Newport. Another was shot near Freshwater, in August, 1858, as I am informed by Mr. Rogers.

Longeared Owl. Is very scarce and local as a native bird. A few seem to arrive in winter, one having been obtained at that season near Bembridge, in 1858. During many years' observation Mr. Rogers has only once met with the longeared owl at Freshwater, where he obtained a pair, male and female, on the 14th of November, 1859.

Tawny Owl. Is equally rare. One came under the notice of Mr. Rogers at Freshwater in September, 1856.

Woodchat. Has within the last few years twice bred at Freshwater. As one of the young birds was shot by Mr. Rogers in September, 1856, there can be no doubt as to the identification of the species, although the parents were carefully respected. One, if not both nests, with the eggs and young birds, are in Mr. Bond's collection.

Pied Flycatcher. Was unusually numerous on its spring passage last April, and specimens were obtained at different points in the western parts of the island, especially at Freshwater. Though scarcely more than an accidental visitor, the pied flycatcher, in a few instances, has remained to breed in the Isle of Wight. A nest and three eggs were taken by Mr. Rogers at Freshwater, in May, 1858.

Ring Ouzel. A pair of these birds has more than once been observed during summer, as if nesting. In July, 1857, Mr. Rogers shot an adult male, and observed the hen bird in company with it; a pair had been previously noticed in the summer of 1856. In the Undercliff also the ring ouzel has been seen in the breeding-season by Mr. H. S. Leeson.

Golden Oriole. A male bird of this conspicuous species made its appearance at Freshwater in May, 1859, when it was observed by several persons.

Black Redstart. Though appearing in very limited numbers may fairly be reckoned a winter visitor. It seems to prefer the southern and more rocky shores of the isle: and scarcely a season passes without several of these "winter redstarts" being seen, and many more must no doubt escape observation.

Grasshopper Warbler. Has one or two favourite breeding haunts in the vicinity of Bembridge, where it may often be heard at dusk uttering its curious *spinning* note, to my ear more like that of the nightjar than of any other bird. At Bembridge the grasshopper warbler frequents thick bushy underwood rather than marshy localities; when out at night in search of insects we once traced it to its retreat, where we discovered our little friend snugly posted in the very centre of a bush, and were surprised to find him continue his song, utterly regardless of the lantern by whose light we were observing him within

a few feet. Mr. Rogers reports the grasshopper warbler a regular summer visitor to Freshwater; but the nest taken on the slopes of the Whitecliff, and formerly referred to this species, is now believed by Mr. Bury to have belonged to the rock pipit.

Reed Wren. Has been observed at Freshwater by Mr. Rogers; in Sandown Marshes it is far less numerous than the sedge warbler.

Garden Warbler. I shot a single specimen in a garden at Bembridge in August, 1848, its song at this late season having attracted notice; the bird has also been obtained about Newchurch and at Freshwater, but it is one of the most uncommon of our summer visitors.

Lesser Whitethroat. Has been found by Mr. Rogers at Freshwater, but is rare in that locality.

Wood Wren. Has been observed a few times in the more wooded parts, having been heard by Mr. Bury in Youngwood Copse, and once near Ryde by myself; but at Freshwater Mr. Rogers speaks of it as being a regular summer visitor, partial to fir plantations.

Dartford Warbler. Besides the localities already given in the 'Zoologist,' this bird is found in the boggy ground near Godshill, known as "the Wilderness," also at Freshwater, &c. Mr. Bury has recently noticed that during winter the Dartford warbler is constantly driven up before his dogs when beating a field of turnips: it is almost needless to remark how well this agrees with what is said of its resorting to the cabbage gardens in Provence.

Firecrested Regulus. May now fairly be reckoned a rare winter visitant to the Isle of Wight, one specimen at least having been obtained in December, 1857, among a number of Reguli that were knocked down with sticks and stones near Alum Bay: out of those brought to him Mr. Beazley, the bird-stuffer, at Ryde, selected the brightest for preservation, and this proves to be a well-marked male of the firecrest. What proportion may have belonged to the rarer kind cannot now be conjectured, but the tameness of the flock sufficiently indicated a recent arrival.

White Wagtail. Was observed near Freshwater by Mr. Bond, in May, 1859, and, during the same month, near Sandown by Mr. Rogers.

Tree Pipit. Is not considered rare at Freshwater, and has been ascertained to occur in one or two other localities, mostly to the north of the chalk downs; but it is decidedly local. On its autumnal migration the bird has been noticed in the Undercliff by Mr. H. S. Leeson.

Rock Pipit. Frequents the muddy estuaries of the north side of the island, as well as the rocky southern shores. *Observation.*—It may well be expected that the scarce Richard's pipit will ere long be added to our Fauna, likely as it is to be found during the winter months upon low-lying meadows and pastures bordering on the sea.

Snow Bunting. Was obtained by Mr. Rogers at Freshwater, during the severe frost of February, 1855, and again at the early date of October 28th, 1859 (Zool. 6780).

Brambling. Was common at the same date as the preceding: a small flock was observed at Bembridge, associated, as usual, with chaffinches, in December, 1848.

Tree Sparrow. Usually seen in severe weather only, and at long intervals; one, however, was killed at Freshwater so late as May, in 1858.

Hawfinch. Three shot near Brading at the end of November, 1859, were observed to feed upon the seeds of ash and maple (*Acer campestris*).

Redpole. Mr. Rogers shot two at Freshwater, in June, 1855, which is in favour of the bird occasionally nesting in the island.

Crossbill. A few were observed at Bembridge early in June, 1856; a small flock remained throughout July, 1859, in the neighbourhood of Sea View, where fir trees abound, and these birds would sometimes make short excursions to Bembridge.

Rosecoloured Pastor. A specimen shot near Sea View, in May, 1854 or 1855, is in the Museum of the Ryde Philosophical Society. A second shot on Headon Hill two years ago was preserved by Mr. Rogers.

Chough. Is believed to have become extinct at the Needles, but a pair builds regularly in the cliffs between Niton and Blackgang Chine.

Hooded Crow. Is certainly very scarce, and I have seen it only two or three times about Brading Harbour. Those who have studied Mr. Knox's remarks in the 'Ornithological Rambles' will not fail to observe how completely the rarity of the hooded crow in the Isle of Wight agrees with what has been ascertained of its distribution in Sussex.

Green Woodpecker. One was killed near St. Helen's in May, 1855. Another was repeatedly heard in Youngwood Copse by Mr. Bury, in the autumn of 1857.

Greater Spotted or *Pied Woodpecker.* Two were observed to

haunt the trees along the shore at Bembridge early in October, 1857. Mr. Rogers has also obtained the bird once at Freshwater, but both kinds of woodpecker are only known in the Isle of Wight as occasional stragglers from the mainland. It is somewhat remarkable that the nuthatch has not yet been observed, since it is said to be common in some parts of the opposite coast, and is stated to be migratory in Sussex.

Bee-eater. Once shot near Freshwater, in June, 1855 (see Zool. 4870).

Kingfisher. Few of the kingfishers, which in autumn frequent our creeks and shores, are reared in the Island. The nest has been occasionally found in Sandown Level; and Mr. Rogers has discovered a most unusual breeding haunt near Freshwater, where, it appears, the kingfishers lay their eggs in the crevices of some caves opening to the sea. No English writer that I am aware of mentions this kind of situation being chosen for the nest, though it would appear that upon the Continent, not fissures of caves only, but also hollow trees are occasionally tenanted by the kingfisher.

Rock Dove. Two were obtained at Freshwater in November, 1857. "Large flocks occasionally appear in Sandown Level."—*Mr. Bury.*

Turtle Dove. Was accidentally omitted from Mr. Bury's List; as might be expected, the bird is sufficiently common during the summer months.

Redlegged Partridge. Has been twice shot to my knowledge; one at Grove and another at Freshwater; both single birds, and probably stragglers from the mainland.

Quail. Was shot in Whitefield Wood, January, 1859, and at Freshwater, in March of the same year. "A single bird frequented a turnip field, near Sandown, in December, 1857, and January, 1858."—*Mr. Bury.*

Stone Curlew. Occurred at Freshwater in the winter of 1854—5, and at Bembridge, late in the autumn of 1857. Two were flushed by Mr. Bury, on the 16th of November, 1858, in a turnip field, near Sandown.

Dotterell. Mr. Rogers has once or twice noticed it to visit Freshwater, on its spring passage at the end of April. He has seen it several times in September also.

Gray Plover. May be considered, like most of the large sandpipers, a bird of double passage. It is occasionally seen in Brading Harbour and along the shore at Bembridge in September; and was observed on the 8th of May, 1857, on the 30th of May 1858, and again on the

19th of May, 1859, being then in the full breeding plumage: a most remarkable and beautiful bird.

Turnstone. Occurred at Bembridge in September, 1857, and again on the 31st of March, 1858.

Sanderling. Has been several times obtained at Bembridge about mid-winter. It usually keeps apart in small parties of five or six, but is also occasionally associated with the large flocks of dunlins and ring dotterells (here called "ox birds"). Mr. Rogers considered the sanderling rare at Freshwater; he obtained a specimen on the 20th of December, 1859.

Squacco Heron. A single bird of this scarce species was shot at St. Helen's, on the 19th of May, 1858; and was taken, still alive, to to Mr. Beazley, of Ryde. When first seen it was described as pecking about on the sea beach, near the Old Church sea mark; and when disturbed it did not fly far, but alighted near some tame ducks upon the village green, where a shot was obtained without much difficulty. The bird has now passed into the collection of Mr. W. Borrer, of Cowfold.

Spoonbill. Was shot at Newtown, November, 1845. Another was seen during a flood in Sandown Marshes, January, 1849.

Whimbrel. Appears regularly in May, when it associates with the bartailed godwits, it is again seen towards the middle of August and in September; but I cannot remember to have met with it in mid-winter.

Redshank. Is, with the oystercatcher, a bird of double passage, and but rarely seen in Brading Harbour.

Green Sandpiper. Mr. Rogers assures me that the green sandpiper does not breed at Yarmouth, and those seen in the early autumn are probably migrants that have just led their young brood across from the mainland; but more commonly the bird is a late autumn visitor. One was shot early in December, 1859.

Common Sandpiper. Is known to frequent during summer the shingly beach at the foot of the Freshwater Cliffs and in Tollands Bay; though its nest has not yet been found, Mr. Rogers is confident that it breeds in these localities, different though they be from its usual haunts at the season. A few stray birds may occasionally be met with till quite the end of September, and I have shot the common sandpiper so late as the 27th of October, but they mostly leave us long before the latter date.

Greenshank. Has occurred several times in Brading Harbour, at

the end of August and beginning of September; less frequently in spring.

Blackwinged Stilt. Has been ascertained by Mr. Bury to have been once killed at the western end of the Island; date not known.

Bartailed Godwit. Unlike others of its tribe, is more often seen at the period of the spring movement. In May, 1858 and 1859, a flock numbering some thirty of these birds remained for about a fortnight in Brading Harbour, and some of those then shot were in the perfection of summer plumage. At this time the difference between the sexes was very strongly marked, and they could be easily distinguished a good way off as the red and the white birds. In no females that I have seen does the bay colour extend over the whole under parts, and if the red plumage is ever completely assumed by them (as seems likely from a remark in Montagu's 'Ornithological Dictionary'*), it is probably only in the case of very old females; those I have examined were but slightly tinged beneath with pale rust-colour, their neck thickly set with narrow dark streaks, and the breast covered with spots and bars of different shades of brown, the upper parts duller than in the male. Evidently the sexes of the bartailed godwits are much more different from each other in spring than those of the blacktailed godwit.

Curlew Sandpiper. I have twice shot at Bembridge, in September, 1848, and on the 25th of August, 1858.

Knot. Is rather scarce in Brading Harbour, where it usually occurs in September. I have only once met with the adult bird, and that was in August, 1852.

Water Rail. Has been ascertained by Mr. Rogers to breed in two or three marshy localities near Yarmouth.

Gray Phalarope. One was caught by the hand at Bembridge, after a gale, in October, 1857. Another was shot off Sea View, in November, 1858. Mr. Bury shot one in a ditch, near Pan Common, quite early in September, 1857. Mr. Rogers obtained a gray phalarope on the 1st of November, 1859.

Bernicle. Is very rare. Besides the specimen mentioned by

* Under the head of Snipe, Redbreasted, it is stated, in the 'Supplement to the Ornithological Dictionary,' that a bird (shot May 21) with its throat, fore-neck, breast, belly and sides bright bay, proved to be a female. Other writers (as Temminck, in his 'Supplement') speak of the females being a little less bright than the males; but the difference amounts to far more than this, and is well expressed in Mr. Jenyn's 'Manual,' p. 202.

Mr. Bury, two were killed at Freshwater, during a severe frost, in March, 1858 (see Zool. 6097).

Canada Goose. Four were shot at the same time with the bernicles; but their remarkable tameness seems to favour the idea that they were escaped rather than truly wild birds.

Gadwall. "Has been obtained at Yarmouth."—*Mr. Bury.*

Eider Duck. The eider was among the numerous ducks that visited Freshwater in the severe weather of February, 1855. A female was obtained by Mr. Rogers on the 19th of December, 1859.

Tufted Duck. One was seen in Brading Marshes so late as the 26th of April, 1858.

Smew. A young male bird was shot near Freshwater on the 18th of December, 1859 (*H. Rogers*).

Redbreasted Merganser. Is a regular winter visitor. Being a shy bird and clever diver it is seldom shot except when it enters the creeks in hard weather, and those which are thus obtained in Brading Harbour are mostly young birds. Mr. Rogers tells me that at Freshwater the merganser occurs every winter. It is known to the fishermen by the name of "spear duck" or "spear wigeon."

Rednecked Grebe. Has within the last few years been twice obtained near Freshwater by Mr. Rogers.

Great Crested Grebe. I have only once met with it at Bembridge.

Eared Grebe. Was killed off Sea View in December, 1858, in company with another "dusky grebe" of the horned species. Besides the slightly upturned beak, other marks of distinction between the two birds, when in winter plumage, will be found in the eared grebe having the head less tufted, the whole plumage of a darker hue, the fore-neck blacker, and only the first six quills black—the white occupying nearly all the inner web of the seventh,—while in the horned grebe the white does not commence until the twelfth quill. Though sought for many years past, this is the first instance in which I have fallen in with an eared grebe, all the other "dusky" grebes I have examined having proved to belong to the horned species.

Blackthroated Diver. Hardly more than an occasional visitor (see Zool. 4629); but all kinds of "loons" have been scarcer and more difficult to obtain during the last three or four winters.

Ringed Guillemot. Mr. Bond has seen two specimens that were killed near Freshwater in 1856 and 1857. A third was obtained off Niton in June, 1854, as I am informed by Mr. H. S. Leeson.

Black Guillemot. One obtained near Yarmouth in 1853 or 1854

has been seen by Mr. Bond. Yarrell mentions its occurrence in Christchurch Bay.

Little Auk. Occurred off Sea View in November, 1858, and at Freshwater on the 24th of December, 1859.—*H. Rogers.*

Northern Puffin. Mr. Bond obtained at Freshwater, in 1856, a puffin, which he recognised as distinct from the common species. There is still some uncertainty whether the bird be certainly identified with the Normon glacialis of Temminck, of which little more is known than the bare description. I am much indebted to my friend Mr. Bond for permitting me to anticipate his announcement of his discovery of this bird, which is I believe new to the British list.

Shag. One or two pairs are all that are now known to frequent the Freshwater Cliffs in summer.

Sandwich Tern. I first obtained close to the "Noman" Buoy on the 13th of April, 1858, rather an early date, I believe, for the bird's arrival; and again on the 19th of September last we met with two off the entrance to Brading Harbour, an old bird that had nearly assumed the winter plumage, and a bird of the year.

Common Tern. Was numerous in September and October, 1858. At that date no arctic terns were noticed.

Arctic Tern. The only example I have seen was one picked up dead at Bembridge in October, 1857.

Lesser Tern. A small flock of these fairy little creatures was observed flitting about the shingle point at Bembridge early in May, 1850. A little tern was also obtained by Mr. Rogers at Freshwater in the spring of 1855.

Black Tern. Two young and an adult bird visited Brading Harbour in September, 1858, and shortly afterwards I shot a black tern at Spithead as it was sitting on the water with several common terns. About the same date many other specimens were obtained in different parts of the island.

Little Gull. A young bird shot by Mr. Murrough, of the Royal Hotel, in Freshwater Bay, has been seen by Mr. Bond.

Kittiwake. Certainly does not breed at the Needles. The herring gull is the only one of its family that nests every year in the Isle of Wight.

Lesser Blackbacked Gull. Cannot be said to breed regularly on the cliffs. One or two pairs have been known to nest at Freshwater, in 1857 and 1858, but this is said to be a very unusual occurrence.

Common or *Great Skua.* Mr. Bond has once seen this bird in the hands of Mr. Rogers at Freshwater.

Richardson's Skua. Is far from common, and, during many years' observation, I have only once met with a skua on the waters between Bembridge and Portsmouth. Early in September, 1856, I saw a small dark skua in pursuit of some blackheaded gulls at the entrance to Brading Harbour, and the bird was noticed at the same time by several other persons, by whom a black gull was evidently considered a most extraordinary sight.

Forktailed Petrel. A specimen was brought to Mr. Rogers in 1857; another on the 4th of November, 1859.

It may not be out of place to enumerate here the species which have been ascertained to occur in the Isle of Wight since Mr. Bury first drew up his list in 1844-5, when the number amounted to 193. This has now been raised to 219 by the addition of the following birds:—

Marsh Harrier
Woodchat
Golden Oriole
Garden Warbler
Wood Wren
Firecrested Regulus
White Wagtail
Tree Pipit
Bee-eater
[Turtle Dove]
Redlegged Partridge
Sanderling
Squacco Heron
Spoonbill
Blackwinged Stilt
Canada Goose
Gadwall
Redbreasted Merganser
Eared Grebe
Ringed Guillemot
Black Guillemot
Northern Puffin
Sandwich Tern
Common Tern
Lesser Tern
Little Gull
Great Skua

Several of these have already been mentioned in a revised account, written by Mr. Bury for a new guide-book, 'The Garden Isle.' It is singular that neither Temminck's nor the little stint has yet been observed.

A comparison of the Isle of Wight catalogue with that of Sussex, as given in the third edition of Mr. Knox's 'Rambles,'* shows the following results:—

	Raptores.	Insessores.	Scansores.	Grallæ.	Natatores.		
Isle of Wight -	18	94	8	37	62	=	219
Sussex - - -	22	100	9	52	66	=	249
Great Britain -	34	126	18	70	106	=	354

* Two or three species have been added to the Sussex list from Yarrell (third edition) and the 'Zoologist.'

The Isle of Wight claims nine birds not yet found in Sussex, *viz.*:—

Woodchat	Canada Goose
Crested Titmouse	Black Guillemot
Whitewinged Crossbill	Northern Puffin
Black Woodpecker	Masked Gull
Squacco Heron	

A. G. More.

Bembridge, December, 1859.

Occurrence of the Great Gray Shrike (Lanius excubitor) *at Forres, N.B.*—An esteemed friend and excellent naturalist, at Forres, sent me, the other day, a fine specimen of the above bird, which I have put into the hands of a birdstuffer. My friend writes me that "it was shot by Mr. Mackintosh, shoemaker, in a garden on the south side of the town (Forres), between the Free Church and the Mills, having been started from a hawthorn hedge. On the hedge, and at the spot from which the bird rose, the headless body of a robin was found partially devoured. Another individual of the same species (shrike) was seen at the same time; and on a subsequent day one, probably the same, was observed at the same place." The recent appearance of this bird is recorded for several localities (Zool. 6808). The one I now give is the most northerly where the observation has been made and published, and is the third time I have known this bird to have been met with within the province of Moray. —*George Gordon; Birnie by Elgin, January*, 1860.

Occurrence of Larus icthyaëtus, a new British Gull, in Devonshire.—Among the many objects of Natural History discovered during the past months may be noticed the following remarkable bird. This bird, to which may be applied the term of the giant of the blackheaded gulls, was shot by a boatman, Mr. William Pine, while employed by William Taylor, Esq., of Bridgewater, who was engaged in fishing for bass in the river off Exmouth, about the end of May or the beginning of June last; it was in company with a flock of ordinary gulls. Its remarkable size and appearance attracted the attention of the boatman, who, having his gun with him, singled it out, and fortunately obtained the bird, which has since been kindly presented, by the above-mentioned gentleman, to the writer. The usual locality of this bird is the shores of the Caspian Sea, but it is also recorded as having been found on the shores of the Red Sea, the Ganges and the Ionian Islands, as well as accidentally on the margins of the Danube, in Hungary. One is led to suppose that it is by no means a common bird, as examples are rarely seen in collections. It is the Larus ichthyaëtus, *Pall. Itin.* ii., *Ap.* n. 27; *Id. Zoogr.* ii. p. 322, t. 77; *Rüpp. Atlas*, t. 17: the great gull, *Lath. Gen. Syn.* iii. pt. II. p. 370: Xema ichthyaëtus, *G. R. Gray, List of Gall. &c. B. M.*, p. 171. Head entirely, and part of neck pure black; the rest of neck, beneath the body, upper tail-coverts, tail, ends of scapulars and secondaries pure white; the rest of upper surface of a pale plumbeous-gray; quills pure white, with the ends black and the tips white, which latter colour is more prominent on the first quill, while the second has the black also divided irregularly with white near the end; a small white mark above and beneath the eyes. Bill at its base livid-yellow, with a crimson ring-like spot near the tip, which is fuscous-yellow; and

the feet fuscous-red. When first obtained the circles round the eyes were red. Length 25 inches; wings 18 inches 6 lines; tarsi 3 inches; bare part of thigh 1 inch 9 lines; bill from gape $3\frac{5}{8}$ inches, from forehead 2 inches 6 lines. Pallas informs us that this bird, when flying, emits a hoarse, raven-like cry of "kou, kou." He further says that it lays its eggs on the bare sand, without the least preparation of a nest: they are in shape an oblong-oval, marked with frequent brown spots, with some paler ones intermixed. It is known on the borders of the Caspian Sea by the name of "Rybak" or "Gluchar," and by the Tartars as "Charabalta."—*F. W. L. Ross; Topsham, November* 24, 1859.—[*Obligingly communicated by G. R. Gray, Esq.*]

Notes of the third Capture of Scymnus borealis (Flem.) *off the Scottish Coast.*—The Scymnus borealis (the *Squalus Carcharias* of Müller's 'Prodomus' and Fabricius' 'Historia Naturalis Greenlandiæ,' or, as it is better known to whalers, the "Greenland shark") though common in the Arctic regions, is a rare fish in the British seas. Professor Fleming mentions that he was in possession of the jaws of one—presented to him by the late Mr. Simmonds—which was caught in his presence in the Pentland Firth, in 1803; and that Mr. Edmonstone witnessed one $13\frac{1}{2}$ feet long, which was found dead in Burra Firth, Uist, July, 1824. Mr. Yarrell notices one which was caught off the coast of Durham, in April, 1840, and is now in the University Museum of that city. The present specimen was caught on the morning of the 2nd of May, 1859, in the Firth of Forth, by some of the Newhaven Fishermen, having primarily got entangled in their fishing lines. It was about 10 feet long, and was brought up to the University, in the Museum of which Institution it will be deposited. On being dissected its large stomach was found to be very full and distended with the morning meal, though it is represented by Scoresby and others to be a mild member of a proverbially voracious family. Thus, so far as I am able to learn, this is only the fourth capture on record in the British seas, though it may in all probability have occurred oftener in remote situations without meeting the prying eye of the zoologist;—the third off the Scottish coast, and the first in the Firth of Forth. It may, therefore, with great justice be ranked as one of the rarest of those fishes which, though not inhabitants, except in rare occasions, of our seas, have yet been classed among its already overburdened Fauna.—*Robert Brown; Edinburgh, January* 11, 1860.

Occurrence of Octopus vulgaris at Babbicombe.—I have just obtained a fine specimen of the poulpe (*Octopus vulgaris*), on Babbicombe beach, where it had been left by this morning's tide. It was dead, but had evidently been alive only a few hours before. Its colour was white, marbled on the dorsal surface of sac, head and arms with red-brown. Its dimensions were as follows:—Length of one arm from mouth, 25 inches; length of sac, ventral side $5\frac{1}{2}$ inches, width $4\frac{1}{2}$ inches, total length 34 inches. I attempted to count the number of suckers on one arm, and made out about 108 pairs, but one-third of these could be enumerated only by the aid of a lens, and on the terminal portion (about an inch) I could no longer separate them even with that aid. Fleming (Brit. Anim. p. 253) says of this species, "with about *two* 240 suckers," by which odd expression I should have supposed he meant 240 pairs, or else

that it is a typographical error for 240, meaning 240 in all, or 120 pairs, which would nearly agree with mine. Cuvier (Règne Anim.) gives 120 pairs. An adult specimen of this species is sufficiently scarce to be worthy of record in the 'Zoologist.'—*P. H. Gosse; Torquay, January* 23, 1860.

Supplement to a Note on the Arachnida of Dorset and Hants. (Zool. 6493). By the Rev. O. Pickard-Cambridge, B.A.

In the communication above referred to, on the Spiders of Dorset, &c., I ventured to predict that the British species of this order were not nearly all yet discovered. The results subjoined, of the snatches of leisure that I have been able to devote to the subject during this past season, have fully borne out my prediction. The List annexed contains all the species that I have found this season, not contained in my last year's List; and so it is a kind of supplement to that one.

In the present List there are ten species either new to science, or else hitherto unrecorded as British, although known on the Continent.

In addition also to these, I have seven species belonging to the genera Neriene and Linyphia, and several species of other genera, found on the sand hills at Southport and at Portland, most of which I have reason to believe are undescribed species; but they await further examination.

Order Araneidea.—Family Lycosidæ.

Lycosa nivalis (*Koch*). A specimen of this species was found by myself on the sand hills, Southport, in June, 1858, but not discovered to be L. nivalis until April, 1859, when an extensive series of both adult and immature specimens, proved its identity. It had not before been recorded as British. It is one of the most numerous as well as most active spiders on the sand hills, and, in common with others of this genus, disappears as if by magic the moment the sun is obscured. Its egg-sac is characteristic, being of a pale flesh-coloured pink.

Family Salticidæ.

Salticus floricola (*Koch*). An adult male and female of this pretty species (hitherto unknown as British) were discovered by myself, on the north sand hills, Southport, in June, 1859, at the roots of grass and moss. The male is new to Science; the female alone being previously known to Arachnologists.

S. reticulatus. Specimens of this minute Salticus were captured,

when in company with Mr. Meade, in a wood near Bradford, among moss and decayed leaves, in May, 1859.

Family Thomisidæ.

Thomisus claveatus (*Walck*). A specimen of this very peculiar and distinctly marked Thomisus was found by myself near Pennsylvania Castle, Portland, in September, 1858, but it was unfortunately lost before its species was ascertained. This last October (1859), however, I have succeeded in capturing, on the same ground under stones and pieces of rock, several adult specimens. Walcknäer speaks of it as a very rare spider on the Pyrenees and in Egypt; its rarity he accounts for, from its sparing fertility, its egg-sac only containing five or six eggs at a time. It is the most sluggish, inactive species that I have met with, of even this generally very inactive genus.

T. audax. Three specimens of this species were captured on the sand hills, Southport, in May, 1859.

Family Drassidæ.

Drassus pumilus. Adult males and females of this well-defined species were discovered by myself on the north sand hills, Southport, during the summer of 1859. They were found both running on the bare sand, and also lurking at the roots of moss and grass: it seems, however, to be a rare species, and has not hitherto been recorded as British. It has a remarkable facility of burying itself in the loose sand at the approach of danger; several of those I captured were out of sight in a minute.

D. clavator. An adult male of this species (new to Science) was discovered by myself on the north sand hills, Southport, in April, 1859, by raking with a stick under the rooty ledges of the sand hills. I captured also an immature female under a stone on Kirkby Moss, near Liverpool, June 14th, 1859; and in October of the same year, I found it in abundance, under stones and pieces of rock, close to Pennsylvania Castle, Portland. It is a fierce, active spider, and, among the rocks, very difficult to capture. A description of this species, to which I have given the name "clavator," from the very large club-shaped digital joint of the palpi, will appear shortly in the 'Annals and Magazine of Natural History.'

D. lapidicolens (Clubiona lapidicolens, *Walck.*). An adult male was captured at Freshwater, Isle of Wight, in May, 1859, by my friend Frederick Bond, who kindly forwarded it to me, together with specimens of the new Ciniflo (C. mordax) discovered there by

him last year. This is only the second record of the occurrence of "D. lapidicolens" since its insertion in the list of British spiders, by the late Dr. Leach.

Family Ciniflonidæ.

Ciniflo ferox (*Koch*). The British species hitherto known as Ciniflo ferox turns out, on the capture of the true "ferox" of Koch, at Portland, in September last, to be a distinct species; to which Mr. Blackwall has therefore given a fresh name, "similis." C. ferox (*Koch*), was captured at Portland by myself in 1857, and since again in September, 1859, and has also been taken at Bradford by Mr. Meade, but it has not until now been recorded as a native of Britain.

Family Theridiidæ.

Theridion riparium. An adult male of this distinctly marked species was captured and sent me, from Bath, in July, 1859, by my friend T. W. Huthwaite.

T. pictum. I found an adult female of this rare and handsome spider on a holly-bush at Formby Parsonage, near Liverpool, in June, 1859; and subsequently I found it tolerably abundant in a green-house and on holly-bushes at Birkdale Park, Southport: only one previous instance has been recorded of its capture in Britain.

T. Carolinum. This species, though local, is abundant in many places on the sand hills, Southport, at the base of grass-stems and other herbage, in May and June: I also beat several off a Scotch fir-tree on Simmons-wood Moss, near Liverpool, in June, 1859. It is a very pretty, but very variable species.

T. pallens. On Scotch firs, Simmons-wood Moss, June, 1589, and in September of the same year; abundant on laurels in the Rectory Gardens, Milton, Northamptonshire; its curiously shaped egg-cocoons were fixed to the under sides of the laurel-leaves.

T. variegatum. Found sparingly, together with its beautiful pear-shaped egg-cocoons, among grass and rubbish on the sand hills, Southport, during the summer of 1859.

T. signatum. An immature male of this anomalous-looking Theridion, taken under a piece of rock at Portland, in October, 1859.

Family Linyphiidæ.

Linyphia vivax. Specimens of this species were sent me from Bath (together with other rare and local spiders), in October, 1859, by T. W. Huthwaite.

Linyphia Fenella. An adult male and female taken among herbage on the sand hills, Southport, in July, 1859. The male new to Science.

L. gracilis. An adult male at the roots of grass at Aketon, in Yorkshire, July, 1859.

Neriene gracilis. At Scarisbrick, Lancashire, Aketon, Yorkshire, and also at Bath and Portland, in 1859.

N. apicata. Several specimens among herbage on the sand hills, Southport, in July, 1859.

N. fusca. Several from underneath seaweed on the shore at Southport, in September, 1859; and also received from T. W. Huthwaite, taken at Bath; and I met with it also at Milton, in Northamptonshire.

N. agrestis. From underneath seaweed on the shore, Southport, September, 1859.

N. vigilax. Among herbage on the sand hills, Southport, in July, 1859.

Walckenäera monoceros. A single adult male of this oddly-shaped spider was discovered by myself at the roots of moss on the sand hills, Southport, in September, 1859, and shortly after several more beneath pieces of rock and stones at Portland. This species has not before been recorded as British.

W. fastigiata (*Argus acuminatus*, Walck). A specimen of this species (new to Britain) was discovered by myself on the sand hills, Southport, June, 1859.

W. aggeris. This species (new to Science) was discovered by myself in plenty at the roots of grass and rubbish on the sides of dry banks and ditches, on the sand hills, Southport, during the summer of 1859. A description of this species, to which I have given the name of "aggeris," will shortly appear in the 'Annals and Magazine of Natural History.'

W. parallela. This species (not before recorded as British) I discovered under a piece of rock, near Pennsylvania, Castle Portland, in October, 1859.

Pachygnatha Clerckii. Abundant under Hatta Wall, Formby Parsonage, June, 1859.

With regard to the method of preserving spiders I would add to what I said (Zool. 6493) that small bottles are now found, both by Mr. Meade and myself, to be far preferable to tubes; for the bottles can be corked infinitely tighter than the tubes, and so the evaporation of

the spirit, which was very rapid with the tubes, is almost prevented. The bottles are not much more expensive, and, as the shoulder need be but very slight, the mouth of the bottle will still be of sufficient size to admit of almost as large a spider as the body of the bottle can well contain. Up to this season the nature of the ground I have searched (wood and heath) has made sweeping and beating the successful modes of looking for spiders, but this season these methods have been impracticable on the sand hills, among short herbage and coarse star-grass. Among these I have had to go on my knees and separate the grass and rubbish, when a living world, both of spiders and beetles, has generally been laid open.

O. Pickard-Cambridge.

Errata.—Zool. 6497, *for* Cespiticola *read* Cespiticolis; p. 6499, *for* Pholeus *read* Pholcus; p. 6501, *for* extansa *read* extensa; *and same page, for* Enoculina *read* Senoculina.—*O. P.-C.*

Double-broodedness.—The following is a description of the larva of Hemerophila abruptaria: — Ground-colour clay-brown mottled with faint green, slightly rugose. Head whitish. From the head proceed, as far as the third segment, three dark lines. The two outer ones are bordered by a clay-coloured line, which extends to the anal segment. In the space formed by these lines are twelve triangular dorsal marks, the apices of which meet down the middle of the back. On the anal segment is a black ring. The ground-colour is sometimes chocolate-brown, the markings being barely discernible. Length 1½ inch. Food, privet. The above description is taken from larvæ alive at the present moment. This latter fact induces me to make a few remarks upon the question of double-broodedness. I am not aware that H. abruptaria is considered to produce two broods in the year. The longer I investigate this question (and I have done so with great care the last two years) the more satisfied I am that some insects, in one sense are, and in another are not, double-brooded. By double-brooded, in its strict signification, I understand eggs to be hatched, say, in April; these produce perfect insects in the summer; in their turn they lay eggs; the larvæ produced from them feed up and become pupæ some time in the autumn, and *all* the insects emerge the same year. In such a case I understand an insect to be double-brooded in its strict sense. But there is another kind of double-broodedness, which I term *partial; i.e.*, eggs are laid, as before, in the summer; these become pupæ in the autumn; but only three or four, sometimes only one or two, perfect insects appear that year, the remainder passing through the winter in that state, and emerging in the following spring. Assuming my first definition to be correct, I still adhere to the opinion I have expressed on former occasions, — that many insects termed double-brooded are not so, *e.g.*, Notodonta dictæa, N. camelina, N. ziczac, Ptilodontis palpina, &c. Like those who differ from me—*viz.*, Messrs. Crewe, Gascoyne and others—I have paid great and increasing attention to this matter, especially since I came into Derbyshire, where (at least in my locality) the dearth of insects is so great that I have had ample time to devote myself more particularly to the investi-

gation. I give the following as some of the results. Having prefaced these remarks with a description of the larva of H. abruptaria, I will commence with that insect. My friend Mr. Crewe, at the beginning of last summer, sent me about a dozen and a half nearly full-fed larvæ of this species, with a request that I would take care of them, as he was leaving home for a tour in Scotland. They fed up tolerably well, and in due course went down. After the lapse of a month a crippled female appeared, and was followed, three days later, by a crippled male. Having kept the female alive, I obtained from this pair of cripples a dozen eggs. The rest of the brood from which these two came are still (January) in the pupa state. The dozen eggs hatched almost immediately; the young larvæ, however, feeding so slowly that I at once suspected they were going to bother me by hybernating. When about one-third fed I showed them to Mr. Crewe, who paid me a flying visit on his return from Scotland. In spite of blandishments, such as juicy food and plenty of it, to persuade them to feed up and have done with it, they turned sulky, and exercised a doubtless praiseworthy moderation, continuing, day after day, to nibble at their food (privet) throughout the winter. They are now nearly full-fed, but show no signs of going down; and every time I remove the gauze cover I find them rigidly extended, with a resolution, I would venture to say, worthy a better cause. It is from these I have taken my description. Now, from the circumstance of these two crippled specimens having emerged from the pupæ in the autumn, do I infer that H. abruptaria is a double-brooded insect? Certainly not, at least in the sense in which I understand the term. To prove it double-brooded (strictly) *all* should have become perfect insects. Had they done so I should have said, *primâ facie*, it was a double-brooded insect. But, even so, I should not have been quite satisfied. I should continue the investigation for two or three seasons longer; and if I then found that it was the invariable custom for all the pupæ to produce insects in the autumn, I should unhesitatingly pronounce it a strictly double-brooded species. If, on the contrary, I found a very small minority only coming to maturity, the remainder passing through the winter as pupæ, and if I found this to be the *rule*, I should just as unhesitatingly say that the insect was—anything you like, except double-brooded. The next example I shall adduce is that of P. palpina. A number of larvæ, recently hatched, were sent to me, at the same time as those above-named, by Mr. Crewe. These fed extremely well, and all went down, in number I suppose about thirty. One single insect, a male, appeared about three weeks afterwards. This specimen I showed to Mr. Crewe. All the others are still in pupa. A precisely similar circumstance occurred in 1858, in reference to N. ziczac. I found about sixteen eggs of this species in June. In due time they hatched, fed and spun up, or went down, whichever is the best term. In this case also one insect, and one only, a male, emerged the same year. The last instance I shall bring forward is that of S. conspicuaria. In the autumn of 1858 Mr. Crewe gave me six pupæ of this insect. These all produced perfect insects the following May. From these I obtained eggs, as I was anxious to perpetuate the species, and, if possible, introduce it into the county. In this latter effort I fear I have failed, much to the satisfaction of some I have no doubt. The larvæ hatched from these eggs fed up very rapidly, and went down, in number about fifty-six. Greatly to my surprise, and I may add pleasure, three weeks later one male and two females appeared in the perfect state. From these, again, I obtained a batch of eggs. With equal rapidity these fed up and went down; and both sets of pupæ are now *in statu quo*. Once again I ask, am I to infer from this fact that S. conspicuaria is double-brooded in the strict

signification of the term? In my opinion most assuredly not. To carry out my view, the whole batch of fifty-six pupæ should have produced perfect insects, but only three appeared as above stated. When I say the whole fifty-six should have produced insects, I mean, of course, that none should have survived to "put in an appearance" next spring. It is but honest in me to state that these observations, made by me in doors, are apparently utterly at variance with those made by Mr. C. R. Bree out of doors (Zool. 5871). Mr. Bree states that in the beginning of August a second brood appears, more numerous than the first, *i. e.*, in May. Now *my* August brood consisted of three out of fifty-six, while my brood in the forthcoming May will comprise the remaining fifty-three, *plus* those produced from the eggs laid by the August three, about as many more! Should these remarks of mine meet his eye or those of Mr. Crewe, I shall feel much obliged if they would communicate, in the pages of the 'Zoologist,' some additional and more specific information on the subject. I ask this because I know that Stowmarket is the head-quarters of the insect, and that both gentlemen had ample opportunities of observing its habits. To proceed. Judging exclusively from my own experience, I believe that S. conspicuaria, N. dictæa, N. ziczac, P. palpina, and probably many others, are *partially* double-brooded; that is, a few specimens emerge the same year (for what particular purpose I do not know, except perhaps to obviate the danger of extirpation,— a circumstance not unlikely to occur in the present day), while the vast majority live through the winter in the pupa state. Nay, I go further, and must add that according to my experience even this very limited appearance is exceptional. I readily allow that the remarks of Mr. Gascoyne, of Newark (Zool. and Intell. *passim*), militate strongly against my theory. He speaks of whole broods appearing in the autumn from eggs laid in the spring. From what I have already stated it will be seen how completely this is opposed to my experience. I do not attempt to explain the discrepancy; but if these few remarks are received in the spirit in which they are offered, *viz.*, that of investigation and inquiry, they may probably provoke a friendly (and I deprecate any other) discussion. If so, from among your numerous correspondents some further and valuable information may reasonably be expected. — *Joseph Greene; Cubley Rectory, Doveridge, Derby, January*, 1860.

Description of the Larva of Eupithecia tenuiata. — Short and stumpy. Ground-colour dirty yellowish-green. Sides and centre of back slightly tinged with rose-colour. Down the centre of the back a row of very indistinct dusky spots, becoming confluent in a black line at the anal segment, and bordered by an interrupted black line. On each side a row of slanting tubercular flesh-coloured stripes. Head and fore feet black. Feeds on the catkins of sallow, in spring. Full-fed the end of March and beginning of April. In appearance it much resembles the larva of Eupithecia Haworthiata. I am indebted to the kindness of Mr. Doubleday for the larva from which the foregoing description was taken.—*H. Harpur Crewe; Medsted, Alton, Hants, December* 23, 1859.

Description of the Larva of Eupithecia nanata. — Long and very slender, tapering towards the head. Ground-colour white or greenish-white, with a chain of pear-shaped red dorsal spots, bordered on either side by an interrupted line of the same colour, and becoming confluent on the capital and anal segments. Sides spotted with red. Belly with a central red line running the whole length. Body clothed with a few very short hairs. A very pretty variety of this larva has the ground-colour bright green, with a series of tooth- or pear-shaped white dorsal spots, intersected by a central

horizontal dark green line, becoming purple at the anal tip. Spiracular line white, broken. Back sprinkled with a few short black hairs. Feeds on the flowers of Calluna vulgaris, in August and September. Pupa enclosed in an earthen cocoon. Thorax and wing-cases yellow. Abdomen deeply suffused with red. Thorax considerably elevated. The pupa of the green variety is suffused all over with green.—*Id.*

Xanthia ocellaris. — Through the kindness of Mr. Doubleday, I am able to give more conclusive information on this insect than I was (Zool. 6504), and as it may interest the readers of the 'Zoologist,' I subjoin his remarks. He states that he has received authentic specimens of Xanthia gilvago and Xanthia ocellaris from M. Bellier de le Chavignerie, and that all the British specimens belong to the former species. He also adds that Xanthia ocellaris is very distinct. The upper wings more pointed, slightly falcated, and the nervures paler than the ground-colour of the wings. I have availed myself of Mr. Doubleday's kind information, and forward the above as a supplement, if I may be allowed to call it such, to my previous notes.—*Robert Anderson; York, January* 11, 1859.

Proceedings of Societies.

Entomological Society.

December 5, 1860.—Dr. Gray, President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'Genera des Coléoptères,' par M. T. Lacordaire, Tome v., and 'Atlas,' Livraison 1; presented by the Author. 'Monographie des Elatérides,' par M. E. Candèze; by the Author. 'Transactions of the Zoological Society,' Vol. iv. Part 6; by the Society. 'Farm Insects,' Part 7; by the Author, John Curtis, Esq., F.L.S. 'The Zoologist' for December; by the Editor. 'The Proceedings of the Zoological Society, 1859,' Part 2; by the Society. 'The Athenæum' for October and November; by the Editor. 'The Literary Gazette' for November; by the Editor. 'The Journal of the Society of Arts' for November; by the Society. 'The Entomologist's Weekly Intelligencer,' Nos. 163 to 166; by H. T. Stainton, Esq.

Election of Members.

Roland Trimen, Esq., 71, Guildford Street, Russell Square, and Henry Johnson, Esq., 31, St. Mark's Crescent, Regent's Park, were balloted for and elected Members of the Society.

Exhibitions.

Dr. Wallace exhibited some specimens of the Coquilla nut from South America, the kernels of which had been eaten by the larva of Bruchus Bactris, of which he also exhibited examples.

Mr. Janson stated that he had had the larva of this species alive for the last five months.

Dr. Wallace also exhibited some specimens of Myrmica domestica, which he had lately found in great numbers in his own residence: as this was in the immediate neighbourhood of the British Museum, he thought the authorities of that establishment ought to take every precaution to prevent it from obtaining an entrance therein, as it appeared to be impossible to exterminate them when they once obtained a lodgment, the nests apparently being situated in the foundations of the houses.

Mr. Baly exhibited a fine new Hispa, sent from Batchian by Mr. Wallace, and read the following description of it:—

"Oxycephala imperialis.

"Elongata, subdepressa, pallide fulva, nitida; antennis (basi excepto) piceis; thorace transverso-quadrato, basi ad apicem paullo ampliato, crebre punctato; elytris postice attenuatis, metallico-cyaneis, apice externo rufis, fascia lata obliqua, vix ante mediam posita, extrorsum abbreviata, pallide fulva. Long. 7 lin.

"Hab. Batchian."

Mr. Stainton exhibited a specimen of Margarodes unionalis, a species new to Britain, taken by Mr. King, at Torquay.

Mr. Fereday exhibited a beautiful series of Sphinx Convolvuli, captured this season; and a variety of Colias Edusa, having the central spot on the anterior wings much suffused on the under side.

Dr. Knaggs brought for distribution amongst the members a number of specimens of Amara plebeia, found in his own field at Kentish Town.

Mr. Tegetmeier exhibited specimens of Apis ligustica, of which he had lately received living examples of the queen and workers from the Continent, where it is considered a more profitable species to the owner than the common honey bee; he hoped, during the next season, to test the correctness of this opinion.

Mr. Stainton read a paper "On the Geographical Distribution of British Butterflies."

Some conversation ensued on the probability that the few examples of Vanessa Antiopa, Argynnis Lathonia, &c., which are found in this country, are specimens bred on the Continent, and flown across the channel during favourable weather. Mr. Waterhouse observed that whilst crossing from Liverpool to Dublin in a steamer, a few years ago, on a remarkably calm day, when the sea was as smooth as glass, he noticed the surface of the water was literally covered with butterflies and other insects, which seemed to keep pace with the steamer; thousands of them must have crossed the channel that day: he was convinced that the powers of flight possessed by insects could hardly be over-estimated.

The Secretary read a paper by Mr. Wallace, intituled "Notes on the Habits of Scolytidæ and Bastrichidæ," in which the author expressed his opinion (founded on extensive observations of the habits of those insects in the islands of the Eastern Archipelago) that they only attack trees which are already in a diseased or dying state.

January 2, 1860.—J. O. Westwood, Esq., F.L.S., in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'The Transactions of the Linnean Society,' Vol. xxii, Part 4; 'Journal

of the Proceedings of the Linnean Society,' Vol. iv. No. 15; presented by the Society. 'Exotic Butterflies,' Part 33; by W. W. Saunders, Esq., F.R.S., &c. 'The Entomologist's Annual' for 1860; by the Editor, H. T. Stainton, Esq. 'The Zoologist' for January; by the Editor. 'The Athenæum' for November and December; by the Editor. 'The Literary Gazette' for December; by the Editor. 'The Journal of the Society of Arts' for December; by the Society. 'Descriptions of some Asiatic Lepidopterous Insects belonging to the Tribe Bombyces,' by Frederick Moore, Assistant to the Natural-History Department of the Museum, India House; by the Author. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part xix. Pyralides; by the Author, Francis Walker, Esq. F.L.S., &c. 'Catalogue of British Coleoptera,' sheets H and I; by the Author, G. R. Waterhouse, Esq., F.L.S.

Election of a Member and Subscriber.

J. W. May, Esq., 19, Clifton Road, St. John's Wood, was balloted for and elected a Member of the Society; and R. G. Keeley, Esq., 11, Sydney Terrace, Marlborough Road, Chelsea, and W. G. Pelerin, Esq, 28, Hertford Road, De Beauvoir Square, were elected Subscribers to the Society.

Exhibitions.

Mr. Samuel Stevens exhibited a large box of insects of various orders, sent from Siam by M. Mouhot.

Mr. Groves exhibited a specimen of Libellula pectoralis of De Selys, a dragon-fly new to Britain, taken in June near Sheerness.

Mr. Westwood exhibited a small Lepidopterous larva with eight ventral and two anal prolegs, preserved in spirits, which he had received from a correspondent, who, whilst asleep, was aroused by a smart bite inflicted on his instep, and who, on examination of the part affected, discovered the larva exhibited. Mr. Westwood observed that although some Lepidopterous larvæ were known to be carnivorous, and many species in confinement would devour other larvæ, yet, taking for granted that the larva exhibited was the real culprit in this case, this was the first instance he had heard of their attacking the human species. The larva appeared to be that of one of the Tineidæ, but there was no appearance of a case in which it might have resided.

Mr. Westwood also exhibited an elytron of a beetle (*Broscus cephalotes*) received from Sir C. Lyell, who had sent it to him as that of a "fossil" beetle, having been obtained from Mundesley, in Norfolk, from a formation containing fish remains (as Agassiz determined them) of extinct species, although associated with recent shells. Mr. Westwood, however, had no doubt that the elytron was a recent one, and it was not difficult to account for it being found in such a situation, as the species is common under marine rejectamenta on the coast, and it might readily be supposed that the working of worms might have carried down so small an article as the elytron of a beetle. The fact, however, possesses a certain interest in connexion with that of the flint arrow-heads in the drift, which is attracting so much attention at the present time.

Dr. Allchin exhibited a small flask, constructed of brass, for introducing small quantities of chloroform into pill-boxes containing Lepidoptera, for the purpose of killing them; he and others had experienced much inconvenience in using chloroform for this purpose when engaged in collecting, and the instrument exhibited was calculated to remove all difficulty, as by means of it a single drop could be introduced into a pill-box without any risk of spilling or evaporation.

Part 4 of the current volume of the 'Transactions,' recently published, was on the table.—*E. S.*

York Entomological Society.

The Annual Meeting of this Society was held on the evening of Monday, the 2nd inst., at 7, Castlegate, at which Mr. Prest presided. T. Hornby, Esq., of Barmby Moor, near York, was elected a Member.

The Meeting then elected the following officers for the ensuing year: — President, Rev. J. D. J. Preston; Vice-Presidents, Rev. F. O. Morris and Mr. W. Prest; Committee, Messrs. F. J. Wade, J. Robinson, C. Helstrip, T. Wilson and J. T. Carrington; Treasurer, Mr. J. Birks; Secretary, Mr. R. Anderson.

The following is a copy of the Annual Report:—

"In presenting the third Annual Report, it is satisfactory to observe the steady progress of the Society. During the past year thirteen new members have joined, whilst it has only sustained the loss of one, leaving an increase of twelve members, as compared with the corresponding period of the previous year. The ordinary monthly meetings have been well attended, and many objects of interest have been exhibited, amongst which was a specimen of Anchocelis rufina, captured near York, by Mr. Birks, with singular abdominal appendages, not previously noticed, but which it is stated subsequent investigation has shown to be common to other species of the genus. From a record kept of the captures during last year, a list has been prepared, showing that five hundred and twenty-three species of Lepidoptera have been taken by the members, of which the following are additions to the previously recorded Fauna of this locality, viz.:—Liparis monacha, Acidalia inornata, Collix sparsata, Dicranura bicuspis (pupa), Apamea connexa, Agrotis præcox, Cloantha Solidaginis, Acentropus niveus, Spilodes sticticalis, Ephestia pinguedinella, Argyrolepia cnicana and Psyche roboricolella, all of which (excepting Dicranura bicuspis) have been exhibited at the meetings. The following are also included in the captures of 1859:—viz., Acherontia Atropos, Sphinx Convolvuli, Sphinx Ligustri, Macroglossa bombyliformis, Sesia culiciformis, Lithosia helveola, Epione vespertaria, Ennomos fuscantaria, Geometra papilionaria, Phorodesma bajularia, Acidalia rubricata, Acronycta leporina, Acronycta Alni (larva), Acronycta Ligustri, Leucania pudorina, Mamestra abjecta, Tæniocampa opima, Tæniocampa Populeti, Orthosia suspecta, Heliothis dipsacea, Pyralis glaucinalis, &c.

"In consequence of the increasing attendance of members, bi-monthly meetings have been appointed for the winter months.

"Papers on objects of interest have been read, including one 'On the Proper Method of Setting Insects,' by the Rev. F. O. Morris (President), and one 'On the Distinctions of certain Species of Lepidoptera,' by Mr. Anderson. Several useful entomological and botanical works have been added to the library. The thanks of members are due to Mr. W. Winter and the Rev. F. O. Morris for donations of local species for distribution. Although Lepidoptera at present appear to absorb the attention of the members, it is hoped that in future other branches of the Science will receive due attention, and that persons studying them will not be backward to enter the Society, as the Committee will always endeavour to add works on other sections of Entomology, and give every facility for their study."—*Robert Anderson, Hon. Sec.; York, January* 9, 1860.

Note on the partiality of the Coati-Mundi for Tobacco.—A gentleman, formerly resident in Demerara, informed me that a tame coati-mundi which he possessed whilst there would eagerly seize the end of a cigar when offered to him, and, unrolling the leaves, would diligently and vigorously rub his tail with them, beginning at the root of the tail and subjecting the whole of that organ to this singular process. In consequence of this information I tried the experiment on a coati-mundi which I have in confinement, and which, to my surprise, immediately went through precisely the same performance which my informant had observed in his Demerara individual, both with portions of cigar and also with tobacco in the form in which it is sold for use in the tobacco-pipe. From the account given to me of the tobacco-loving coati-mundi which my friend possessed in Demerara I am disposed to think that was an individual belonging to a different species from that in my possession, and if so the coincidence of habit in this curious particular between the two animals is perhaps the more singular on that account.—*J. H. Gurney; Catton Hall, Norwich; February* 3, 1860.

Notes on the Mountain Birds of Jamaica.

By W. Osburn, Esq.*

"Agualta Vale, Metcalfe, Jamaica,
January 4, 1860.

"My dear Sir,—It will, I think, serve in some degree to illustrate the remarks I have to make on the birds which frequent this north-eastern sea-bord, if I first note some of the many features which distinguish the district from those I have previously visited.

"In travelling eastward along the sea-side road through St. Mary's, just after passing the little group of negro-huts and wooden houses called Ora Cabessa, the road zigzags to the summit of a lofty promontory called the Crab Woods. It proves to be perfectly flat for a couple of miles, very dry, and, being exposed to the full fury of the sea breeze, barren all but a scanty crop of fan-thatch palms and the hardy stunted shrubs peculiar to such situations. These, shaped by the prevailing direction of the wind like a clipped hedge, keep off the breeze, but afford no shade. But on arriving at the eastward edge of this table-land, even a mid-day ride across is repaid by the magnificent view its elevation gives of the mountains of Metcalfe and St. George: they rise in detached and separate peaks, round which the sea breeze, however fine the day, scarcely fails to roll some fleecy clouds, and therefore differ equally from the successive ridges of the tertiary limestone and the 'crumpled-paper' appearance of the porphyritic

* Communicated by P. H. Gosse, Esq., F.R.S.

conglomerate. From these, ridges and spurs plunge so abruptly into the Caribbean, in successive headlands and points, all down the coast, perhaps as far as Portland, that the mountains almost seem to rise from the sea. The little islet just below, crowned with its tuft of green bush, and which renders the deep bay of Port Maria so picturesque, is tertiary limestone, but the dark cliffs immediately behind the town belong to the transition rocks of Sir H. de la Beche, as from that point this, our oldest formation, commences. In the lower range of the parish of Metcalfe this is represented by a shale, in thin layers, often so contorted as to be schistose; in this the mountain torrents (called here rivers) have worn channels so deep that a great part of their winding courses seems ever in gloomy shade. The rains also have an extensive influence on it: when they are unusually heavy the torrents carry off their banks, and thus, half water, half land-slip, rush down to the rivers, tearing the mountain-sides with those tracks of ruin and force familiar to travellers among mountain scenery. Over such a country roads can only be carried with considerable difficulty, and the river beds usually serve as such. Under the action of these streams the shale seems to dissolve into mud and be entirely carried away; the river-beds are therefore composed of boulders and pebbles, chiefly of amorphous rocks washed out of the conglomerates above. This 'gravel,' as it is here called, which the Rio Minho must have made you familiar with, fills these narrow gorges to the limit of the flooding river, usually their whole extent, and composes its bed to the sea. Sir Henry de la Beche has introduced between these mountains of transition shale and the sea a band of tertiary limestone; but I have only been able in Metcalfe to find very occasionally masses of this rock, the rest consisting of marls,—in some instances chalky and white, but generally so mixed with sand and clays as to be scarcely recognisable.

"This forms a range of hills gently rounded as if by denudation, and it is on these much of the sugar cultivation is carried on. The narrow border between their base and the beach is occupied by an alluvial, the site of a chain of lagoons and swamps. This alluvial marks the line of junction of the limestone with the conglomerate, as, just below Dover estate, low reefs, close in-shore, of that formation may easily be examined. From this the surf washes out a 'gravel' not distinguishable from that brought down by the rivers: its great force and constant direction heap this into a ridge higher than the land behind it, and thus the rivers on approaching make a sudden angle, and after a course of some distance, almost parallel with the

beach, enter the sea in a very oblique direction, or if the current be not very strong the surf places a dry bar completely across it. It is on a narrow strip, scarcely more than a bar, of this 'gravel,' that the little town of Annotto Bay is built, in front of a large lagoon and morass. The road from thence to Buff Bay runs for a considerable distance along it, where it is only just wide anough for the purpose. But another source of supply to these swamps, besides the interrupted surface drainage, is the great number of springs, of very considerable volume, which here find egress. In paddling down a canal cut through the morass at Dover I found them welling out between the roots of the flags that fringed the low bank at every few yards. This is doubtless the drainage from the marly hills, which rises to the surface at the point it meets with the impervious conglomerate. One remarkable feature of this beach of shingle or 'gravel' is that it renders the coast quite untenable to the mangrove. Along the whole coast line, from the mouth of the Wag Water to St. George's, no clump of this tree is to be met with; and this is the more remarkable as it has firmly established itself in a large lagoon called Alligator Pond, but does not seem able to extend beyond it. I thus have not fallen in with a single specimen of the pretty little warbler I alluded to in former letters as Sylvicola eoa. The place of the mangrove is supplied by a thin line of Coccoloba uvifera, much weather-beaten; and under its shelter flourish many maritime plants and shrubs—a Chrysobalanus with leaves and fruit much larger than the species common in Westmoreland, and Ecastophyllum Brownei, whose papilionaceous flowers, of a delicate white, would scarcely have been looked for in such a situation. Viewed from the coast the country has a cultivated look very unusual in Jamaica. The gently swelling hills from Blowing Point, and those all along the base of the higher mountains, seem occupied by extensive pastures, and patches of the same soft green appear, in the most inaccessible places amid dark woods, towards the summits of the mountain peaks. But the hills near Blowing Point are now only the site of numerous 'thrown-up' estates, the cultivated appearance being caused by the almost exclusive possession taken of the soil by a 'Guinea-grass.' The difference between this and the true Guinea-grass of the western parishes is well known to the pen-keepers of St. Ann's, who generally stub it up as a noxious weed, under the name of 'St. Mary's Guinea-grass.' Whether the distinction between the two has been botanically recognised I do not know, but in appearance it is considerable, principally with regard to size. It is here eight feet high or more, and so

extremely coarse that horses will eat only the young leaves and shoots. It grows equally well along the edges of the morass or hill-sides, and once having obtained possession of the soil resists the encroachments of the 'bush.' The patches on the mountain-sides are doubtless the sites of deserted negro-grounds.

"I may mention, in connexion with this, that on my first arrival in the parish I missed that very familiar bird, Quiscalus crassirostris. I soon found, however, that, though it was wanting in the neighbourhood in which I happened to be, small flocks were to be met with here and there; but these will bear no comparison, as to number, with those of the western parishes. The Crotophagas appear, on the contrary, to be increased in numbers.

"As I observe, the diminished numbers of the former bird are usually to be met with about estates actively cultivated: it may possibly be that the tall Guinea-grass which occupies so large a portion of the lowlands does not suit them as foraging-ground, which they can only find in the small area still cultivated.

"Another of the remarkable features of the district is the prevalence of a palm called by the negroes 'Maccafat' (*Cocos fusiformis?*) Its tall stem, swelling upwards club-like, is armed with the most formidable thorns. It grows with an abundance I never saw elsewhere in Jamaica. It requires care to keep it out of the pastures. There are clumps of it along the river-courses; it abounds in hill-side thickets. In the same situations Inga vera is abundant, a tree new to me also, whose night-blowing flowers, though faded, are much frequented by humming-birds. I can scarcely omit notice of a splendid Aristolochia common in the hedges here, A. grandiflora? The singular helmet-shaped flowers, of a tawny-orange veined with purple, measure ten inches across, and are furnished with a long tape-like appendage, twenty inches in length, which sways about beneath. A single spray will bear numerous flowers in different stages.

"One of the points which have attracted my attention the most with regard to the birds of the district, I alluded to in my last letter, viz., the almost constant occurrence of flocks of Acanthylis along the coast, within the sound of the surf. With these I have also often noticed flocks of Hirundo euchrysea, similar to those I observed last year at this season about Mahogany Hill. On my arrival at this estate I was much pleased again to hear, for the first time this winter, the long-drawn notes of the solitaire (*Ptilogonys*); and yet we are here in the alluvial valley of the Wag Water, scarcely more than a mile and

a half from the beach, and the trees on which the bird was singing can hardly be two hundred feet above the sea.

"Mr. Hill ('Birds of Jamaica,' p. 56) considers Acanthylis only an occasional visitor to the South-east. Your observations established the same fact for the South-western coast. I found them more common, during the winter, at Mahogany Hall (about 1000 feet); but in Metcalfe, at the same season, they are constantly to be seen close to the sea.

"Hirundo euchrysea is so brilliant a little bird that it is almost impossible it could escape an observer of Nature, even were its visits very rare. But Mr. Hill is quite silent as to its occurrence in his neighbourhood. It escaped your observation for two winters, mine for one, in the South-west, though I afterwards saw it close to the southern base of the central range at Oxford, in Manchester. At Mahogany, at this season, I found them appearing, at intervals, in large flocks; but here the same flocks hunt on fine mornings along the coast.

"Ptilogonys, I think there can scarcely be a doubt, occurs, during the winter, on the South side only, at the elevation you discovered it, 2600 feet. I met with them in Trelawny at a height I should estimate at least at 1000 feet less, and here they may be heard at a very slight elevation above the sea.

"And thus, were we to trace on the map lines representing the boundaries of the different winter migrations of all three species, they would singularly coincide: the great basins of the South side would be cut off the lines, keeping close to the central range, or including only lofty spurs; whilst on the North side they would descend much nearer the coast, keep at a less elevation, and as the mountains increased in height and the lowlands shrunk in extent they would finally coincide with the coast-line.

"Hence it appears that these mountain species, though they do not frequent the hot South-side plains and coasts, during the winter migrate downwards to a certain temperature. And should we be surprised at this? The influence of altitude on temperature, — an influence which intensifies as we approach the tropics, — is fully recognised in other departments of Science, and perhaps is less so in Ornithology, only because observation in the tropics, where it is likely to be most felt, are made with greater difficulty and to a less extent than elsewhere. But it should be borne in mind that the Hirundines, in migrating downwards as the winter approaches, probably gain an increase of temperature of fifteen or twenty degrees, or,

what is perhaps the principal object, avoid the heavy rains, fogs and cold of the nights and mornings, and find within a short distance all the circumstances which combine to produce a plentiful supply of prey,—a change evidently quite as adapted to the bird's wants as that which the swifts that wheel round the church towers of England obtain after a distant migration. That the distance of a migration is very short, is not a reason why it may not be very effective, if these circumstances be taken into consideration. Many more instances in favour of this might be advanced, and I am inclined to think that the further our observations are extended the more will the existence of this double migration in the tropics be recognised—the one external, or a migration of latitude; the other internal, or a migration of altitude. In the latter the observer of Nature may see, passing as it were before his eyes, a representation of the former. Lines, however, representing the boundaries of the *summer* range of these three species, would by no means maintain the same coincidence.

"Ptilogonys certainly leaves the mountains of Trelawny during the summer, though their elevation is not less than 3000 feet, and, from information collected in your work, appears to be confined, for that season, to the still higher chains of this end.

"Hirundo euchrysea I found at Freeman's Hall in solitary pairs, and but few of them.

"The line indicated can only be comparatively called the *winter* boundary of Acanthylis, as the powers of flight of these birds are so great, and their habits lead them to take so wide a range, that probably during the whole summer, under certain conditions of weather, &c., they visit at intervals their winter haunts.

"I have given these observations in some detail, because they seem of more than mere theoretical importance. The case of a naturalist may easily be supposed whom circumstances led to the southern foot of the central range during the cold months. He might there see, once or twice, H. euchrysea, and procure specimens; he then might pass a whole year on the South coast, and even travel extensively on the North coast, without again falling in with them, and thus be led to conclude them to be stragglers from some external migration, when they really only travel up and down the mountains.

"A seventh species of Hirundine must be added to our Jamaica list. I saw it once, at Falmouth, on the coast, May, 1859, and early in the following October at Llandovery Estate, St. Ann's, close to the sea, and a third time here on the 15th of November last. It is immediately distinguished from H. pœciloma, which it most resembles, by

its long forked tail and more rapid flight, but might easily be taken for the English bird, H. rustica, but it is, I think, ruddier beneath, and has on the outer vane of each tail-feather a conspicuous white oval spot. It may possibly prove to be the American barn swallow (*H. horreorum ; H. americana*, Wils.), as I learn from a very careful paper, published by Messrs. Newton, in the 'Ibis,' on the birds of St. Croix, that they visit that island during the autumn, but in the same transient way.*

"P.S.—The scenery has taken up a larger portion of my letter than I contemplated, but I was desirous of carrying into effect your valued recommendation of more description of this. I also thought it might aid to give a notion of the causes which combine greatly to influence the Ornithology of this district. I can scarcely hope I have succeeded; but I thought my only chance was, not to attempt to convey impressions merely, but to endeavour to pourtray a few of the more salient and peculiar features. The geology seemed the best means of doing this, but I have kept to points which I could examine for myself, and which appeared quite undeniable. In this I have been greatly assisted by De la Beche's map.

"*Errata.*—May I be permitted to make the following corrections of statements in my last letter on Chordeiles :—

"1. Since writing it an opportunity has been afforded me of re perusing White's 'Natural History of Selborne.' I cannot find the remarks I quoted; I have therefore erroneously given him as the author of observations I have seen elsewhere.

"2. I have said, 'But if the insect *intercept* the ray, then its vibrating gauzy wings enable us to see it at a considerable distance.' This is wrong, because, if it intercepted the light, it would appear black. What I should have said is, 'But, seen against the shadow of objects, whilst the insect itself reflects a strong light, its vibrating gauzy wings enable us to see it at a considerable distance.'

"3. A subsequent sentence should stand thus :—'May we suppose the eye of the swallow has the same power under whatever circumstances the ray is reflected?'

"I am greatly tasking your friendly interest in thus sending a letter of errata, but I feel assured you will understand my desire to have my statements as correct as possible.

"I have, during the past week, been exploring the lagoons and artificial canals of this low-lying district, but not with any great

* Or H. fulva, *Vieill.*, perhaps; but neither of these species has any white on the *inner* vanes of the tail-feathers.—*P. H. G.*

success, from the difficulty of procuring a canoe, and still greater of a boatman; for the negroes hereabouts are particularly independent and unmanageable. The pretty little rail, Ortygometra carolina, I find very abundant in such places. I have a specimen in which the buff colour of the vent-feathers is very conspicuous.

"W. Osburn.

"To P. H. Gosse, Esq."

Notes on the Habits of the Jabiru. By George Bennett, Esq.*

A short time since I purchased this rare bird, which was brought alive to Sydney from Port Macquarie, and so little being known respecting its habits I considered the following notes might be interesting. It appears to be a young male, and walks about the yard of the house quite domesticated, making no attempt to fly, nor showing any inclination to leave its domicile. These birds have a wide range over the colony, more particularly about the northern coasts of Australia, and are seen occasionally within the heads and about the sand-banks of the Clarence and Macleay Rivers. They are very difficult of approach, and consequently but few have been obtained, this being the first specimen ever brought alive to Sydney. Among the principal residents in the interior, some inform me that they have only seen four, others only one, during a residence of from twenty-five to thirty years in different parts of the colony. In Leichardt's expedition (according to the account of Mr. Murphy, now residing in Sydney) only two were seen, and these could not be approached sufficiently near to be shot. In 1839 a specimen was shot on Hunter's River, and another on the north shore, near Sydney, about three years since, both of which were presented to the Australian Museum. The person who shot the last bird had the greatest difficulty in procuring it, from its being so very shy and watchful: he was obliged to follow it for several days in its haunts about the salt-water creeks, until he could get sufficiently near to shoot it, which, being a good marksman, he achieved as soon as he could approach within range. Both these specimens were full-grown males, and in fine and brilliant adult plumage. These birds being so rarely seen, and difficult to procure when seen, are valuable as specimens when dead, and much more so when alive. Many of the residents of the northern districts had seen the bird, but rarely, and at a distance,

* From the 'Proceedings of the Zoological Society.'

and were aware how difficult it was to procure them; but none had ever seen it in captivity before, and it was therefore regarded with great interest. The number of skins of this bird I have seen during my residence of twenty-two years in the colony only amounts to four. The bird is very graceful: its attitudes and bearing, whether in a state of repose, stalking rapidly, or walking gently over a lawn or yard, with its measured noiseless steps, have a combination of grace and elegance, and it displays an independence of manner that might be expected in a bird so wild and roaming in its habits. It is gentle and good-tempered, soon gets reconciled to captivity, and seems to take pleasure in being noticed and admired, remaining very quiet to be looked at—keeping a bright eye upon the spectator, however, during the time. Although when first seen it has an uncouth appearance, from the large size of the mandibles in proportion to the body, yet on a closer acquaintance its manner wins upon you, and a feeling of attachment arises towards it from its placid, tame, domesticated manner, elegance of form, graceful carriage and beautiful metallic brilliancy of plumage, more especially over the head and neck.

This bird had been in captivity four months previous to its arrival in Sydney, having been captured by the blacks. It permits any one to approach it, only timidly moving away when an attempt is made to touch it. It sometimes stands quite erect, or on one leg, with the other thrown out; or rests upon the tarsi, like the emu and mooruk, and again upon one leg, with the bill inclined upon the breast. It was very hungry on its arrival at my house, and with the greatest facility devoured ½ lb. of beef, cut into small species, placed in a tub of water, or caught the meat in the mandibles when thrown to it. It also feeds on fish and reptiles. When the food is hard or gristly it is rejected from the mandibles after trying to masticate it, and bruised with the point of the beak until it becomes sufficiently soft to be swallowed. It feeds generally in the mornings and evenings; and although the mandibles look so large, it picks up the smallest object with great readiness, and clatters the mandibles with a loud noise when catching flies.

It preens its feathers, and removes any dirt or insects from them very neatly with the bill, accompanying the action with a degree of ease and grace pleasing to observe. When a tub of water was placed near it, it placed one leg in it, and after drinking filled its beak with water and threw it out again, as if washing out the mandibles. The eye is very large and remarkably brilliant, and yet imparts to the bird a great docility of expression, making it appear—what it is—an amiable

bird, familiar with all around it, liking to court admiration, yet on the watch for any act of aggression. It appears pleased to see any stranger, and evinces but little fear. The horses coming into the yard, even close to it, or any noise, does not seem to annoy it; it only moves gently out of the way. When suddenly started it will flap its long and powerful wings, as if preparing for flight; and it may be regarded as a bird of flight, the whole bulk of the body being so light in comparison with its powerful wings. This bird is partial to salt-water creeks and lagoons. It is usually seen in such localities on the Hunter, Macleay and Clarence Rivers, which consist, near the entrance and for some miles distant, of salt water with numerous sand-banks, where these birds may be occasionally observed busily engaged in fishing. The beak of this bird is large, broad, conical and pointed; the lower mandible is slightly curved upwards; the colour is black. The head is large, and neck thick; both the head and neck are of a rich, deep, glossy green, changing, when it reaches the occiput, into beautiful iridescent colours of violet and purple, which, when viewed under a brilliant sunshine or in a changing light, display the iridescent tints in a most brilliant manner, shining with a metallic effulgence equal to that seen in the peacock. The greater wing-coverts, scapularies, lower part of the back and tail, dark brown mixed with rich bluish green, which changes in the adult to a rich glossy green, tinged with a golden lustre. The smaller wing-coverts, lower part of the neck and back and upper part of the breast white, speckled with ashy brown, which becomes white in the adult. Lower part of the breast, thighs and inner part of the wings white. Eyes brilliant, and dark hazel in colour. The legs are blackish, with a dark tinge of red, becoming in the adult a bright red colour, which, as I have been informed, when the bird flies with legs stretched out, looks like a long red tail. The legs are usually dirty with excremental matter, imparting to them a white appearance, so that the natural colour is seldom seen, except when they just emerge from the water. It is a large feeder, and these birds must consume, in their native haunts, a great quantity of fishes and reptiles.

It measures three feet ten inches to the top of the head, and is not yet full grown; they are said to attain four to five feet in height. It is shy of disposition and difficult of approach in its wild state: this can readily be supposed when it is observed in captivity; for although very docile and readily tamed, still the keen, watchful eye appears always upon you, with a brilliant and piercing look, which causes a feeling of the impossibility of escaping its penetrating glance. Its

feeding-grounds and places of rest being about sand-pits, sand-banks and exposed morasses near the sea-coasts, it is impossible to approach this wary bird without being seen. The first evening it was at my house, seeking for a roosting-place, it walked into the hall, gazed at the gas-lamp, which had just been lighted, and then proceeded to walk up stairs, but, not liking the ascent, quietly walked down again, returned into the yard, and afterwards went to roost in the coach-house between the carriages, to which place it now retires regularly every evening soon after dark. It is always observed to face the sun, and moves about the yard following the course of that luminary: it may always be found in that part of the yard where the sun is shining, and with the face invariably towards it. When hungry it follows the cook about (who usually feeds it); and if she has neglected its food, looks into the kitchen, as if to remind her of the neglect, and waits quietly, but with a searching eye, during the time the meat is cutting up until it is fed. It is amusing to observe this bird catch flies: he remains very quiet, as if asleep, and on a fly passing him it is snapped up in his beak in an instant. The only time I observed any manifestation of anger in him was when the mooruks were introduced into the yard where he was parading about: these rapid, fussy, noisy birds running about his range excited his indignation, for on their coming near him he slightly elevated the brilliant feathers of the head, the eyes became very brilliant, he ruffled his feathers and clattered his mandibles, as if about to try their sword-like edge upon the intruding mooruks; but his anger subsided with these demonstrations, except an occasional flapping of his powerful wings. One day, however, on one of the mooruks approaching too near him, he seized it with his mandibles by the neck, on which the mooruk ran away, and did not appear in any way injured.

On the Great Auk (Alca impennis). By Edward Charlton, M.D.*

Not many generations ago, and long subsequent to the great era of the invention of printing, some gigantic birds inhabited the southern hemisphere, but have now become utterly extinct. The dodo has disappeared from its last habitat in the Isle of France, and not even a perfect skeleton has been secured of its remains; while a still larger bird, the Dinornis of New Zealand, has been in existence,

* From the 'Transactions of the Tyneside Natural History Society.'

perhaps, within the memory of persons yet living, or, at all events, individuals of the species survived until very recent times.

In the far North, in our own days, a similar fate threatens the bird we are about to speak of, though we rejoice to say it cannot be considered as entirely extinct. The destruction of the dodo was, doubtless, owing to the great facility with which that bird was captured, and to the excellence of its flesh for the table; and the latter cause, no doubt, influenced the inhabitants of New Zealand when they hunted down the Dinornis to its utter extirpation.

Not only is the great auk a timid, stupid and gregarious bird, especially in the breeding season, but its flesh was anxiously sought for by the earlier navigators, as superior to that of all others of its tribe. We do not, however, suppose that those rough mariners were very particular in their diet. Any fresh meat would taste exquisitely after weeks and months of privation on salted provisions; and even at the present day the inhabitants of Northern Europe, of Iceland, and of the Faroe Islands, maintain that the guillemot and the razorbill are culinary delicacies of a superior description.

Many of the modern writers on Ornithology have come to the conclusion that the great auk is now really an extinct species. We hope, however, to show that it is not, as yet, entirely extirpated, though, at the same time, we confess our inability to point out its precise habitat. At long intervals, sometimes of ten or fifteen years, a few individuals of this species have made their appearance, during the present century, in the Icelandic seas and other parts of the Arctic Ocean; but no breeding-places to which these birds annually resort is now known to naturalists. With the exception of the late Mr. Bullock, of London, no ornithologist of the present century has observed the great auk in its wild state. Mr. Bullock, as is well known, chased one of these birds in a six-oared boat off the Island of Papa Westra, in the Orkneys, in 1812, where they had bred for many years. The female bird was soon after shot, and sent up to London. But even the older naturalists rarely saw this bird alive. Wormius (or Ole Worm), the Danish naturalist, who wrote in 1655, is almost the only one who speaks of its habits from actual observation. "I received," says he, "three skins of this rare bird from Ferro, and also a living individual from the same locality. The live bird I kept for several months in Copenhagen. It was probably a young one of the species, as in size it did not much exceed the bigness of a goose. It could swallow at once a whole herring, and occasionally could take three in succession ere it was satiated." Wormius's figure in his Museum

Wormianum is, on the whole, pretty accurate, with the exception of the ring round the neck; and it is probably the only drawing that has been taken from the living bird. His specimen, when drawn, was evidently in summer plumage, for in winter the black colour of the throat and fore-neck is replaced by white. According to Benicke, a writer in Oken's 'Isis' for 1824 (p. 88), the eye-spot becomes, in winter, of a dark brown, interspersed with a few white feathers. The specimen in the Museum of Natural History is undoubtedly an immature bird: it belongs to the old Wycliff Museum; but no record has been preserved of where it was obtained. Friedrich Faber, in his excellent 'Monograph of the Birds of Iceland,' published in 1822, at Copenhagen, states that, during his three years' residence in Iceland, he was never able to meet with a single specimen.

Faber's work has unfortunately never been published in the English language, though the late Professor Jameson, of Edinburgh, long ago told us that he had translated it, and we ourselves prepared another version of it more than twenty years ago, which has remained in MS. ever since. "According to native accounts, the Geirfugi, or great auk, formerly bred upon two isolated rocks to the south of Iceland. One of these lies about fourteen miles to the south of the Westmann Isles; and the other, on which the bird was said to have been much more plentiful, is the first of three rocks off the projecting point of Rekjanes, on the south-west of Iceland, and about twenty English miles from the land."

Eggert Olafsen, in his 'Travels in Iceland' (p. 983), accurately describes the great auk, and indicates its two breeding-places, adding that when he was upon Vidoe two boats went off to the Reykianes Rock, and brought him both the birds and the eggs. This was in the year 1770, or thereabouts. "For a long time," continues Faber, "the Icelanders have relinquished the dangerous voyage to the Geirfugi Skjaer, as it could only be attempted, with any chance of success, in the calmest weather, and even then a man had to spring from the boat on to the rock, with a rope round his body, by which, after searching the islet, he was dragged off again through the ever-boiling waves."

In the summer of 1821 Faber hired a fishing yacht at Reykiavik, and, along with a Danish merchant and a Swedish Count, reached the rocks off Reykianes on the 25th of June. For two days they cruised off these dangerous skerrys, and once accomplished a landing, though the Count narrowly escaped with his life, having fallen between the boat and the rocks when attempting to leap on shore. There was not, however, a single bird of this species to be seen; and

the same ill success attended his visit, the same year, to the other habitat of the great auk, near the Westmann Islands. The fishermen, however, in many parts of Iceland, maintained that they saw the bird every year upon the coasts. They seemed to know it well, for they were perfectly aware of its inability to fly, and believed it to be blind, from a flap of skin that hung down over its eyes, an idea undoubtedly derived from the remarkable eye-spot so conspicuous on the summer plumage.

In the summer of 1813 a vessel from Faroe was becalmed off the Geirfugi Skjaer, at Reykianes. The crew, observing the rocks close by to be free from surf, put out their boat, and, landing on the islet, found on it a number of great auks. Of these birds they knocked down with their sticks and secured between twenty and twenty-five individuals, and drove the rest into the sea. One of the birds was taken alive, and brought to Bishop Vidalin, at Reykiavik, who had the specimen stuffed, and sent it to a friend in England. The others, I regret to say, were sold on the spot, and eaten. In the succeeding year (1814) seven of these birds were killed by a peasant at Lautrum bird-cliffs, on the north-west coast of Ireland. They had scrambled on to the low ledges at the foot of the bird-cliff, and were there overtaken by their captors. One of them, before it was taken, bit a boy so severely through the sleeve of his calf-skin jacket that the blood ran down his arm.

The farmer on the Westmann Islands informed Faber that about the year 1800 he caught the only bird of this species he had ever seen, at the bottom of the cliffs on those islands. It was sitting on its egg, which he correctly described to Faber as being nearly equal in size to that of the wild swan, and in form and colour exactly resembling that of the razorbill.

In 1823 two great auks were killed on a low rock near the trading station of Œiebakke, on the southern coast of Iceland.

In 1830 and 1831 not less than twenty-seven specimens were obtained on the Reykianes habitat; and from that time till 1840 about half-a-score were obtained in the same locality.

The last birds taken in Iceland were a pair, male and female, which were shot in 1844, at their nest, on a little islet near to Reykianes.

Of the great auk's appearance in our own British seas during the present century, there have been but very few instances indeed. Besides the specimens obtained in Orkney by Mr. Bullock, one was captured in 1822, in St. Kilda; and the most recent instance on

record is that of a specimen now in the Dublin University Museum, which was taken in May, 1834, on the coast of Waterford. The bird was first seen close to the yaul of a fisherman, and apparently in a starved condition; for on his holding out some sprats to it, it came close to the boat for them. This may, however, have been only that the bird was so little acquainted with man, and quite corresponds with the ancient accounts of its stupid character. Another bird of the species, probably the male of this, was shortly afterwards procured in the same locality, but was not preserved.

In Northern and North-eastern Europe the great auk is equally rare. According to Benicke, a specimen of the great auk was shot in 1794, in the harbour of Kiel, in Holstein; and in 1838 another bird of the species was killed in the neighbourhood of Freidrikstadt. It seems almost certain, too, that in 1848 a great auk was shot on the Island of Wardoe, within the Arctic circle, by one of the peasants there. It is possible that this bird formerly even bred in Denmark, for portions of its skeleton have been found and recognised in the so-called "Kjokken Moddinger," the remnants of the repasts of the aborigines of that country. The bird seems, therefore, in former times, to have been widely distributed on the Atlantic coasts; but its principal habitat was undoubtedly on the eastern coasts of Newfoundland and Labrador. Possibly, in earlier times, it was much more numerous on the eastern shores of the great Atlantic Ocean; but, on the other hand, the few scattered individuals that have appeared on our shores, and in the Faroe and Orkney Isles, may have been originally driven by stress of weather from the American coast, and have settled down on the rocks that they had taken refuge on. On the Newfoundland fishing-banks the great auk was two centuries ago to be found in great abundance. Its appearance was always hailed by the mariner approaching that desolate coast as the first indication of his having reached soundings on the fishing-banks. During the sixteenth and seventeenth centuries these waters, as well as the Iceland and Faroe coasts, were annually visited by hundreds of ships from England, France, Spain, Holland and Portugal; and these ships actually were accustomed to provision themselves with the bodies and eggs of these birds, which they found breeding in myriads on the low islands off the coasts of Newfoundland. Besides the fresh birds consumed by the ships' crews, many tons were salted down for further use. In the space of an hour, these old voyagers tell us, they could fill thirty boats with the birds. It was only necessary to go on shore, armed with sticks, to kill as many as they chose. The birds were so

stupid that they allowed themselves to be taken up, on their own proper element, by boats under sail; and it is even said that on putting out a plank it was possible to drive the great auks up out of the sea into the boats. On land the sailors formed low enclosures of stones, into which they drove the penguins, and, as they were unable to fly, kept them there enclosed till they were wanted for the table.

In 1841 a distinguished Norwegian naturalist (too early, alas! lost to Science), Peter Stuwitz, visited Tunk Island, or Penguin Island, lying to the east of Newfoundland. Here, on the north-west shore of the island, he found enormous heaps of the bones and skeletons of the great auk, lying either in exposed masses or slightly covered by the earth. On this side of the island the rocks slope gradually down to the shore; and here were still standing the stone fences and enclosures into which the birds were driven for slaughter. It is said, too, that as the birds were fat, and burnt well, they were actually used for fuel, as the dried bodies of the auks and guillemots are still employed on the Westmann Islands.

Holböll tells us that no specimen of the great auk has been seen in Greenland since 1815; but Dr. Pingel informed us, in Copenhagen, in 1836, that two birds of the species had been killed there since 1830. One was eaten by the Moravian missionaries as a wild goose! and the other was preserved, and is now in the collection of an ornithologist at Schleswig.

It has been surmised that the present habitat of the great auk may be upon the inaccessible coast of East Greenland; but ships sailing between Iceland and that country never meet with the great auk upon their passage; nor was the bird observed by Scoresby or the few other navigators who approached these ice-bound shores. Nor did Graah observe this bird during his toilsome researches east of Cape Farewell.

It is possible that a few of these birds still survive on the islets of Newfoundland or Labrador; but, if not already extirpated, the great auk will, ere many years have elapsed, be numbered amongst the things that were.

Whitetailed Eagle (Falco albicilla) *near Eastbourne.* — A most magnificent specimen of this eagle was shot on Saturday last, at Birling Gap, by Mr. John Hicks, chief boatman of that station. It was feeding on a dead turtle that had been washed ashore by the late heavy gales. It weighs nearly 8 lbs., measures from tip of bill to end of tail 3 feet, and about 7 feet from tip to tip of the wings. It had been seen

about the neighbourhood several days. The bird is now in my possession. — *John Dutton; South Street, Eastbourne, December* 23, 1859.

Peregrine Falcon (Falco peregrinus) *near Eastbourne.* — A fine female peregrine falcon was shot near here this week, which I saw in the flesh. A fine buzzard was also shot at Compton Place, Eastbourne, the seat of the Hon. Mr. Cavendish.—*Id.*

Occurrence of the Osprey (Falco haliætus) *in Derbyshire.* — About two months since a very fine specimen of the osprey was shot by my relative Sir J. Harpur Crewe, Bart., on part of the Trent which runs through his property in Derbyshire, and is now in his collection at Calke Abbey. The bird had, I hear, for some little time frequented the river near the spot where it was killed. — *H. Harpur Crewe; Wickham Market, Suffolk, January* 31, 1860.

What is Falco Forskalii? — Some little time since I had an egg, very similar in appearance to a kite's or common buzzard's, sent to me from Germany, distinctly marked "Falco Forskalii." I shall feel greatly obliged if any of your numerous readers will inform me what region F. Forskalii is supposed to inhabit, as I cannot find it named in any work to which I have access. — *W. Webster; Upton Hall, Birkenhead, February* 8, 1860.

[Falco Forskalii, or the black kite, is a native of Europe, Asia and Africa. There are specimens in the British Museum from Sweden, Nepal, Egypt and the Cape. In private collections I have seen specimens of this bird from France, Germany, Portugal and Morocco. It is also called Falco ater, F. ætolius, F. austriacus, F. fuscoater, F. regalis, F. cinereo-ferrugineus, F. ægyptius, F. migrans and F. parasiticus. One of these names, F. regalis, was applied in error by Pallas, who believed it a variety of the common kite. The numerous other names indicate slight differences, as of age, sex or country.—*E. Newman.*]

Occurrence of the Roughlegged Buzzard (Falco lagopus) *at King's Lynn.*—I have had a fine female specimen of this bird sent to me for preservation. It was shot at Gaywood, near Lynn, in October, 1859. I was informed that when taken it was about seizing a chicken. I have also received a male specimen of the cinereous shrike (*Lanius excubitor*), shot in November, at Churchwarton, near Lynn.—*W. Wilson; Museum, King's Lynn, January* 26, 1860.

Occurrence of the Alpine Accentor (Accentor alpinus) *near Cheltenham, and the Glossy Ibis* (Ibis falcinellus) *in Somersetshire.*—A fine specimen of the alpine accentor was shot some time ago near Cheltenham; and that beautiful bird the glossy ibis was taken at Shapwick, in the county of Somerset, some months ago, and is in the possession of Mr. White, an intelligent bird-stuffer, living in the upper part of the Bath Road.—*H. W. Newman; Hillside, Cheltenham, February* 1, 1860.

Greenfinch and Linnet Mule.—On Monday, November 14, 1859, a curious hybrid was taken near Brighton, in the common clap-nets used by bird-catchers. It was a cross between the greenfinch (*Fringilla chloris*) and the brown linnet (*F. cannabina*). This remarkable specimen had the large beak, legs, claws, and thick skull of a greenfinch, with the colours on the breast, back and elsewhere of the brown linnet, except that the tail-feathers and primaries were marked with yellow where there is white in the linnet, forming together, to an ornithological eye, a most strange combination. The feathers of this hybrid were clean and perfect, showing no marks of confinement; nor indeed would these birds produce a cross in captivity. When we consider how strictly Nature has guarded her boundaries, and how rarely we find any intermixture of species in a state of freedom, the muel bird under consideration is the more

interesting. It has been carefully preserved by Mr. Swaysland, of 4, Queen's Road, and is now in the possession of Mr. Bond, of 24, Cavendish Road, St. John's Wood, who will be happy to show it to any gentleman who will call.—*Edward Newman.*

Note on a Variety of the Chaffinch (Fringilla cœlebs), *and on a Coot* (Fulica atra) *found in an odd Situation.* — The variety from which I subjoin the following description was procured near the town of Kettering, Northamptonshire, on the 3rd of December, 1859. This same bird had been observed for some months previous to its capture by various persons, as also by the Rev. F. Tearle; but all attempts, which were not a few, to shoot it were futile until the time named above. It is the only instance of a pied chaffinch having come under my notice. The pied markings of this bird are as follows: — Bill much paler blue than in an ordinary specimen, slightly tipped with black. Head and neck white, with the exception of a brownish feather or two; a band of darkish feathers passes round the back part of the head, in the shape of a half-circle, from behind each ear; ear-coverts buffish orange. Back pied white and brown. Rump green. Tail black, with the two outer feathers on each side edged with white. Breast, belly and vent pinkish buff. Eyes hazel. Legs and toes light brown. The bird is an adult male. About three weeks since the gardener of Downing College brought me a coot, which he said he had found down his kitchen area, closely snugged up in one corner. The weather at the time was mild; nor had there been any heavy gales blowing. The bird appeared to be in a perfectly healthy state, and showed no marks of recent confinement. What could have induced it to choose such a strange situation? — *J. P. Saville; Jesus Terrace, Cambridge, February* 7, 1860.

Occurrence of the Coral Waxbill (Estrella astrild) *in the Isle of Wight.* — On the 8th of November last no less than three of these little exotic finches were observed in the neighbourhood of Freshwater Bay. One moment they were on the ground feeding, the next hidden in some bush. It was this movement that caused me to notice them. After some trouble I succeeded in shooting one. Its crop was distended with the pupæ of a dipterous insect. These birds are said to feed upon millet in their native country; but here they would be more likely to suffer from cold than from the want of that food. The specimen alluded to is in the possession of Mr. F. Bond, who informs me that the species inhabits Africa and the Mauritius, and is frequently seen in the shops of the London fanciers, who call it the "coral waxbill," and who do not consider it very hardy. Possibly those I saw had escaped from confinement, or from a ship passing the island or wrecked on its coast: there is no probability of their having voluntarily made so long a pilgrimage from their native country.—*Henry Rogers; Freshwater, Isle of Wight, February* 3, 1860.

Nest of the Green Woodpecker (Picus viridis).—In the 'Zoologist' for 1858 (Zool. 6327), I gave an account of an examination of the nest of the green woodpecker, and of the actions of the bird after the entrance of the nest had been stopped up with a turf. In the spring of the year 1859 it was observed that this obstruction was removed, probably through the influence of the rain in winter, and consequently that the orifice was now of much larger size than is usual in the nest of this bird. But in April it was further noticed that the cavity in the tree was occupied with materials of some other kind than is usual with the woodpecker, and that, among other things, wool was to be seen. This was soon explained by the discovery that the convenient cavity had been seized by a jackdaw, several of which are in the habit of associating with the rooks of the rookery close by. The unfortunate woodpecker had been antici-

pated by the black intruder, and thus was expelled from its hereditary tree, to seek a refuge in some new and untried region; but it was long before I was able to discover to what new district it had taken itself. I have little difficulty in believing that this was at the distance of about a mile; but it seems remarkable that it should select a spot where secrecy and solitude are out of the question. For the first time, in 1859 a woodpecker's nest was discovered in the body of a pollard-ash tree, at a small distance from a frequented farm-house, in the close neighbourhood of a wood, but still at such a distance from other trees as to allow the watchful bird to discover any one from whom danger could be feared to its personal liberty. —*Jonathan Couch; Polperro, Cornwall, February*, 1860.

Attachment of the Creeper (Certhia familiaris) *to its Nest and Eggs.* — During the spring of 1859 I met with a most remarkable instance of the attachment of the creeper to its nest and eggs. Early in May a pair of these birds built their nest in a wooden shed which covered a saw-pit; the nest was placed between the wall and a loose board which was leaning against it, and was an extremely neat structure, formed of little chips of wood, straw, roots, &c., and thickly lined with feathers. Not long after the eggs were laid the saw-pit was occupied by workmen, who were soon busy at their noisy employment within a few feet of the nest; but the hen still sat on. Nor was this her only trial: twice I found the board removed by mischievous boys, the nest being thus laid bare; but on my carefully replacing it the poor little mother returned to her eggs. She hatched her young, but they were destroyed by a cat.—*E. R. Alston; Stockbriggs, Lesmahagow, Lanarkshire.*

Mode of Feeding of the Marsh Titmouse (Parus palustris).—The following curious habit of the marsh titmouse is not noticed by Mr. Yarrell. When this bird is searching for insects in the rough bark of the Scotch fir, it may sometimes be observed to insert its beak under a scale of bark, and prize it off with a jerk, which sends the piece to some distance. While watching a pair of these birds so employed I was struck on the nose by a fragment of bark, although I was standing at some little distance from the tree on which the birds were at work. After examining the place thus laid bare the bird proceeds to another scale.—*Id.*

Martins near Christmas.—In the winter of the present year the cold weather came on us rather early, and the snow had lain on the ground for three days, with frost; the thermometer 33° in my bedroom. About mid-day a small flight of martins made their appearance, after having been lost to us for more than two months. They appeared much more active in hawking for flies than were blackbirds and thrushes, which indeed were much tamed by the cold.—*Jonathan Couch; Polperro, Cornwall.*

Occurrence of the Gray Phalarope (Phalaropus platyrhynchus) *at Swansea.* — A specimen of the gray phalarope was shot in this neighbourhood last week. — *D. Williams;* 56, *Wind Street, Swansea, November* 23, 1859.

The Arctic Tern (Sterna arctica) *nesting on Fresh Water.*—In Thompson's 'Birds of Ireland,' vol. iii. p. 295, it is stated that, "as far as the observation of the writer extended, the arctic tern selects only maritime localities for breeding-places." That the observation of so diligent and accurate a naturalist was in the main correct is highly probable; but it may be worth recording, if only as an exceptional case, that, upon the islets in Lough Carra, Co. Mayo, the arctic tern breeds in company with the common tern; for out of some six or seven birds which I shot there in June, 1851, at least two belonged to the arctic species; and I have their feet and skulls still by

me, as a conclusive proof that there was no error made in the name. — *A. G. More ; Vectis Lodge, Bembridge, February*, 1860.

Errata to the Article upon Rare Birds in the Isle of Wight (Zool. 6849).—P. 6851, line 12, instead of "birds" read "bird;" only one was shot. P. 6855, line 8, instead of "considered" read "considers." P. 6858, line 8, instead of "Normon" read "Mormon" (*i. e.*, Fratercula). P. 6858, line 7, instead of "certainly" read "sufficiently."—*Id.*

Occurrence of the Forktailed Petrel (Thalassidroma Leachii) *at Poole.*—On the 4th ult. I was fortunate enough, favoured by the heavy gales of that date, to make the acquaintance of this bird. It is a very fine specimen, and I have sent it to be preserved for our Museum of Local Natural History, Geology and Antiquities, which I am trying to establish here, in connexion with our Literary Institute. Is not this the first recorded instance of its having occurred in Dorset? A pair of them were observed in our harbour by one of our gunners (men who get a living by shooting wild-fowl), and he shot one for me; the other one he could not get at, and has not seen since. It is very rare here; none of the gunners or our harbour sportsmen knew what it was, or ever recollected having seen it here before as far as I could ascertain. I immediately recognised it as a petrel, the stormy petrel being occasionally seen near here; and my friend the Rev. Mr. Green, of Hamworthy Rectory, identified it for me as the forktailed petrel.—*William Penney ; Poole, November*, 1859.

Capture of the Globe Fish (Tetradon stellatus) *in the Solent Water.* — A specimen of this fish was captured by one of our townsmen, G. Braxton Aldridge, Esq., in the Solent Water, about the middle of August last. He was fishing with a net near Beaulieu River, about four miles from Calshot Castle. At this place the tide falls very rapidly, and leaves the sands dry for miles out. After the tide fell, in a pit in the sand a commotion was observed amongst some sea-weed, and, going to see the cause, this fish was found. It is, I think, a fine specimen, measuring from head to extremity of tail 20½ inches. It answers exactly the description in Jenyns' Man. Brit. Vert. Animals, p. 490. It was sent to Mr. Hart, of Christchurch, who has preserved it very nicely; and will be deposited in our Museum. — *William Penney ; Poole, November*, 1859.

Occurrence of a reversed Specimen of Helix aspersa.—It may interest some of your readers to know that a specimen of this rarity was found by Mrs. H. Adams, in the garden of my residence at Notting Hill, in the early part of last year. — *H. Adams ; 19, Hanover Villas, Notting Hill.*

A List of Southport Spiders; with some Remarks on Uniformity of Use and Meaning of Words in Natural History. By The Rev. O. Pickard-Cambridge, B.A.

In addition to the supplement of my last year's list, I subjoin a list of spiders, observed and captured during the past season at Southport and in its neighbourhood. Local lists, besides having a local interest, are certain steps towards a more correct generalization, in regard to the distribution of species. In this list it will be seen that out of the two tribes of the order Araneidea known to inhabit Great Britain, but one is represented; of the families making up this tribe, nine out of ten are represented (the tenth, however, contains but one British genus and one British species); and out of twenty-eight genera composing the families eighteen are represented; and lastly, out of two hundred and seventy species contained in the twenty-eight genera eighty are represented.

I do not pretend to say that this is a perfect list, for on one side of Southport lies a vast tract of fen or moss land, which I have hardly ever had time to search at all; but the ground I have searched, principally the sand-hills along the coast, has been ransacked pretty thoroughly; and, therefore, as the area is so much the more confused, the list is perhaps of so much the greater value. The relative abundance of species in any locality is also, I think, of importance, but the words we commonly use to denote their abundance or the contrary are generally so vague, and used or understood by different naturalists in so different a sense, that I will just in a few words try to explain the value of the general terms "rare," "common," &c., appended to the names in the list, as I use and understand them.

The term *very common* is used to denote that the species may be taken, in its season, in the locality in question, as we should say in popular language "in any numbers," that is, that a hundred or so might be captured during an afternoon of four or five hours, and this without any special search for it.

Common denotes that, in popular language, "a great many" might be taken in the above time, that is to the number of, say, forty or fifty, and this with but slight search specially for it.

Frequent denotes that a score or so might be taken, in the same time, with an ordinarily careful search for it.

Not rare denotes that a close search will generally procure what we call "a few," that is, from five to ten or a dozen.

Occasional denotes that during the time stated, and with careful search for it, two or three may be captured.

Rare would show that a specimen only would be likely to be obtained, as we should say "once now and then," that is, about once out of several afternoons' very careful search.

Very rare would denote that one or two specimens in the run of a season, would be all that a careful search and open-eye for it would obtain.

It will perhaps appear trivial to some to attempt to define these general expressions. It is, I admit, very difficult to do so, for we know that their force will vary according to the number of hours, or the state of weather, during which the search is carried on; and again, according to different persons' powers of close search, that is, their power of concentrating the attention on one object, for this is really, I believe, the secret of obtaining so-called rarities. And again, the knowledge or ignorance of the habits of the species searched for, and in fact many other things, will come in to prevent perfect uniformity of meaning, whatever terms we may choose for the purpose of specifying relative abundance; yet the want of a little more accuracy and uniformity than now exists will always, it seems to me, take away more than half the real value of local lists of species. And in regard to other parts of Natural Science, the want of uniformity of use and meaning, has produced and still produces great confusion and hindrance; I allude to the sense attached by different naturalists to the words "order," "family," "tribe," "genus," "subgenus," &c. And how few systematic works on Natural History state the principles of their systems, the meanings of their classification, the values of their divisions; what one may call a "tribe" another calls a "family," and so on. And even the careful reader is often compelled to stop in the study of his favourite branch of Natural History, perplexed by a perfect labyrinth of classification, and without any clew as to whether his author looked on the names of the divisions of his system merely as bare landmarks to direct the traveller into unknown regions, or as terms to point out real divisions written and existing in Nature herself, and so only to be set up where the divisions exist in Nature, without regard to the mere convenience of students and collectors. So that I repeat the want of attention to an uniformity of use and meaning of words does seriously retard the

science of Natural History, with reference to its injury to the science of classification. I have perhaps strayed from my immediate object in mentioning it now, though I hope some day to recur to it again. To return to our present subject, I by no means stickle for the use of the words "common," "rare," &c., in the senses in which I have now used them; I only throw out these as hints, and should like to see such practical entomologists as my friends Frederick Bond, H. Harpur Crewe and Edwin Shepherd, &c., putting forward in your pages the senses in which they use and understand these or equivalent words. Local lists, even with all this, and much more care, will yet be imperfect, but without it they will be both practically and theoretically valueless towards the great object of such lists, the constructing a scientific system of distribution and relative abundance of species.

Tribe Octonoculina.—Family Lycosidæ.

Lycosa Agretyca. Frequent. Among grass and herbage on banks and sides of ditches, &c.

L. campestris. Not rare. In same places as L. Agretyca.

L. andrenivora. Very rare. On the open sand hills.

*L. nivalis. Common. Running on the sand hills in sunshine.

L. rapax. Frequent. In company with L. Agretyca.

L. picta. Not rare. On the open sand hills.

L. saccata. Frequent. On moss land, &c., among grass.

L. obscura. Occasional. In company with L. saccata.

L. exigua. Very common. Almost everywhere.

L. cambrica. Not rare, but very local, among grass in the "stacks."

L. piratica. Frequent, but local, in same localities as L. cambrica.

Family Salticidæ.

Salticus scenicus. Not rare. On walls, posts, palings, and occasionally under ledges on the sand hills.

S. sparsus. Rare. On trees, among grass stems and on walls.

*S. floricola. Very rare. At the roots of grass, &c., on the "north sand hills."

S. frontalis. Frequent. At roots of grass and rubbish, on bank-sides, &c.

S. cupreus. Very rare. In company with S. frontalis.

Family Thomisidæ.

Thomisus cristatus. Occasional. On the bare ground and at grass-roots.

T. audax. Very rare. On the bare ground and at grass-roots.

Philodromus cespiticola. Frequent. On dwarf willows on the sand hills.

P. oblongus. Common. At the roots and on the stems of the "star-grass."

Family Drassidæ.

*Drassus pumilus. Rare. On the bare sand hills, and at roots of grass and moss.

*D. clavator. Very rare. Under ledges of sand hills, at roots of grass and under stones.

D. cupreus. Frequent. Under ledges of sand hills, at roots of grass and under stones.

D. nitens. Not rare. Among rubbish on dry bank sides; and in spring, the adult males running on paths and roads.

Clubiona holosericea. Occasional. In angles of summer-houses and in curled leaves.

C. amarantha. Frequent. At roots of star-grass and in curled leaves.

C. epimelas. Rare. In curled leaves and in holes in posts, &c.

Argyroneta aquatica. Occasional. In moss-dykes, among water-weed, &c.

Family Ciniflonidæ.

Ciniflo atrox. Not rare. Under ledges of sand hills, overgrown with dwarf willow.

C. similis. Not rare. In outhouses and unused rooms, &c.

Ergatis benigna. Very rare. Running on paths in spring.

E. latens. Rare. Running on paths in spring.

Family Agelenidæ.

Agelena labyrinthica. Very common. All over the willow-clad sand hills.

A. brunnea. Not rare. At roots of star-grass and weeds, &c.

Tegenaria civilis. Frequent. In outhouses and old unused buildings.

Family Theridiidæ.

Theridion lineatum. Common. Almost everywhere.

T. quadripunctatum. Rare. In summer-houses and unused rooms.

T. nervosum. Not rare. On bushes, &c., in its web.

T. pictum. Not rare. On hollies and in greenhouses.

T. varians. Frequent. In company with the two last.

T. carolinum. Common, though local. Among dwarf willow and herbage on the sand hills.

T. pallens. Rare. On Scotch firs.

T. variegatum. Occasional. Among grass and weeds on dry banks.

T. filipes. Rare. Beneath sea-weed on the shore.

Family Linyphiidæ.

Linyphia montana. Frequent. On Scotch firs, &c.

L. marginata. Frequent. In hedges and in angles of outhouses.

L. pratensis. Frequent. On low plants, &c., in woods.

L. fuliginea. Rare. Among star-grass, &c., on sand hills.

L. minuta. Not rare. Ditto (and in porches and unused rooms).

L. alticeps. Frequent. Ditto.

L. tenuis. Common. Ditto.

L. terricola. Common. Ditto.

L. anthracina. Rare. Ditto.

L. pulla. Rare. Ditto.

L. ericæa. Frequent. Ditto.

L. tenella. Very rare. Ditto. The male adult new to Science.

Neriene bicolor. Frequent. At roots of star-grass on sand hills.

N. gracilis. Occasional. Running on walks, rails and pavements.

N. cornuta. Occasional. Among grass on sand hills.

N. apicata. Very rare. Ditto.

N. longipalpis. Common. Among grass, under sea-weed and on pavements.

N. fusca. Rare. Under sea-weed in autumn.

N. agrestis. Rare. Ditto.

N. vigilax. Very rare. Among grass on sand hills.

N. trilineata. Common. Ditto.

N. variegata. Frequent. Ditto.

*Walckenäera Aggeris. Common. Among rubbish and grass on dry bank sides on "north sand hills.

*W. monoceros. Very rare. Among grass and moss on sand hills.

*W. fastigata. Very rare. Ditto.

Pachygnatha Clerckii. Frequent. Under wall, Formby Parsonage.

P. Degeerii. Frequent. Among grass and moss on sand hills, and adult males running on roads in spring.

Family Epeiridæ.

Epëira quadrata. Frequent. On bushes, &c.

E. apoclisa. Common. On plants, &c., at edges of dykes especially.

E. solers. Very rare. Among dwarf willows on sand hills.

E. similis. Common. In balconies, windows and greenhouses.

E. calophylla. Occasional. On bushes and dwarf willows.

E. cucurbitina. Rare. Ditto.

E. inclinata. Very common. Everywhere.

E. diadema. Very common. Ditto.

Tetragnatha extensa. Frequent. Among herbage and low plants in damp places and over water.

PS.—Those spiders, the names of which are marked with an asterisk, are either new to Science or to Britain. (See "Supplement to a Note on Arachnida of Dorset, &c.," Zool. 6700.)

O. P.-Cambridge.

Southport, Lancashire,
January 17, 1860.

On the Functions of the Antennæ of Insects.—Every entomologist must be familiar with the fact that when a moth singes its antennæ in the flame it is more or less incapable of directing its flight, and usually spins in circles on the surface with which it may come in contact, with its head downwards. For a long while I supposed that this was a mere expression of pain, until I experimented in various ways with this instrument for the purpose of ascertaining its function. My first experiments consisted in the excision of the antennæ, immediately above the bulbs, in the male Saturnia Cecropia, as soon as it had escaped from the cocoon, and before expansion of the wings had begun. The circulating fluids exuded, and soon formed over the cut surface a clot, by which it was permanently closed. There was no escape of air from the severed tracheal trunk, nor any indications of respiratory effort on the part of the imago, neither was the globule of fluid taken up through the tracheal trunk. The mutilation gives rise to very little expression of pain after the first shock of the operation, and the imago fixes itself as usual to expand its wings, expansion taking place as completely as in the unmutilated specimen. On the approach of night the mutilated male makes no voluntary effort to use its wings. He is gentle and docile, and permits himself to be handled without betraying a desire to escape or any sense of danger. If at this time one endeavours to compel him to fly, he agitates his wings with a trembling motion; and if thrown into the air, uses them so ineffectually as not to break the force of his fall, or so as to precipitate him head foremost to the earth, with a shock that appears to benumb him. By persistence he is at last, perhaps, driven to use the organs of flight; but whilst

employing them with vigour his position is reversed in mid-air, and he descends to the earth, vainly endeavouring to change it or arrest his fall; or he dashes himself with violence against some obstacle, thus bringing his flight to a sudden conclusion. The power to hover has been completely lost. After a few efforts of this kind it becomes almost impossible to compel a mutilated specimen to attempt flight. It will remain fixed in one place for two or three days, and at the end of that time may make a voluntary effort to use its wings. The irregularity, not to say the madness of its flight, is no less observable than in the beginning. Under these circumstances one of my specimens escaped into the open air from my study in day-light. After extricating himself from amongst the branches of a tree standing near the door, he arose into the air in a spiral track, around which he ascended until attaining a height at which he was almost lost to sight. Here he maintained himself by sailing on his wings, until I lost sight of him by intervening houses. But though I placed myself quickly in a position to see him again, he was nowhere visible, and must have descended suddenly from mid-air. The males of the same species, taken by what is called pairing, in full possession of all their powers and instincts, and animated especially by the sexual instinct, are strongly attracted by light. If the light in a room be so guarded that the specimen cannot injure itself, and a perfect male be held by the thumb and fingers beneath the wings and thrown with force in a direct line from the light, the individual, by the use of the wings, will arrest himself as the force of the impulsion diminishes, and, reversing his position in the air, will return to the light in a direct line. This may be repeated any number of times, and will be followed invariably by the same result. Let the antennæ of the specimen then be excised in successive portions. The excision of the upper third does not diminish the power to arrest itself and to return again in a direct line; but, beyond this point, flight begins to be impaired without effecting in any manner the desire to return, until at last we reach a point where it becomes evident that the voluntary direction of flight is no longer under the volition of the insect, or that some co-ordinating influence is wanting, having special relation to the direction of flight, or the uses of the muscles of the alary organs. Instead of being capable of arresting itself and returning in a direct path, the insect now darts from the point of arrest to the right or left, to the ceiling or the floor; and this uncertainty of direction and inability to arrest the force of impulsion continues to increase until we reach the neighbourhood of the bulb, when the voluntary employment of the wings almost ceases. All these results are obtained simply by the excision of the pectinations of the antennæ, leaving the antennal stalks uninjured. The desire to fly is not affected in the first place, and it is only after the individual ascertains the uncertain nature of his efforts that he fixes himself in a state of rest. The structure of the organs, together with these experiments, entirely justify the inference that the antennæ, instead of being organs of any special sense, as they are usually regarded, are, in Lepidoptera, instruments of atmospheric palpation, having especial reference to the action and use of the wings in flight. This conclusion has been reached contrary to my own preconceived ideas of the functions of those instruments; and I believe the view here taken is entirely new. Should the experiments be repeated by any observer, he should be careful to select for experimental study those lepidopterous insects that are unprovided with simple eyes or ocelli on the vertex at the base of the antennæ. In those species with ocelli on the vertex flight is deranged scarcely at all, as compared with the effect of antennal excision on individuals unprovided with these organs. — *Dr. Clemens, in the 'Journal of the Academy of Natural Sciences,' Philadelphia.*

Argynnis Lathonia.—I see that the question of the indigenous character of this insect is still doubted by the members of the Entomological Society and others. I may state, upon the authority of Dr. Maclean, who is one of the best observers with whom I am acquainted, that he is in possession of evidence which clearly and beyond all doubt proves that this insect not only is taken but breeds in this neighbourhood. He has taken the insect both in spring and autumn, and one female which contained fully developed eggs. The insect has been taken in this neighbourhood by at least three, if not four, different people.—*C. R. Bree.*

Vanessa Antiopa in Wakehurst Wood.—A beautiful day was the 6th of April, 1859; the sun shone most brilliant, and as hot as in July. I was walking through Wakehurst Park, Sussex. All at once I saw something flying which appeared unusual; it was about twenty yards from where I stood, but the leafless branches of an oak were between me and the object, so that I could not distinctly see what it was. I thought it settled a little beyond the oak, and immediately went towards it. At this spot the underwood was cut, but the heath, intermixed with the dead fronds of the brake, was as high as my knees. Amongst this I was cautiously stepping, when, to my great surprise, a most beautiful large Vanesssa Antiopa came flying slowly towards me, and passed within a few feet; so close was it that I could see the angles of the beautiful broad white border and of the wings. To capture it I had no means; even if I had it would have been difficult, on account of the unevenness of the ground and the height of the heath. With the sun shining it looked as bright as if it was just from the pupa; but I suppose it had hybernated.—*Edward Jenner.*

Early Appearance of Dasychira pudibunda.—On the 3rd of this month a fine specimen of this moth emerged from the chrysalis. For a short time it was very active, but it has been ever since quiescent, perhaps torpid. The caterpillar spun its cocoon on the 29th of last September, and the chrysalis was kept in a room the temperature of which, in winter, never varies more than a few degrees from 62° day or night. I suppose it is this comparatively high temperature which caused the fly to appear at this unusual time of the year.—*Thomas Clark; Halesleigh, January* 17, 1860.

Description of the Larva and Pupa of Endromis versicolor. — In April the female lays her eggs on the slender twigs of the birch tree, and the caterpillars come out about the 1st of May. At first they are gregarious, spinning a web over the twig and attaching themselves by their claspers, and holding their heads straight up in the air; when just hatched they are smoke-coloured, with a darker line down the back, and a dark oblique mark on each segment: there are pimples or warts all over the body, each emitting five or six black hairs; the lip in front of the head is yellow, and there are two yellow crescent-shaped marks immediately behind the head: the legs are reddish yellow. After changing its skin the first time, and eating its cast-off coat, an operation which it invariably performs, the caterpillar becomes of a dull pale green colour, covered with minute black points, and having a conspicuous narrow dark line down the middle of its back; on each side is a series of paler green diagonal lines; the head is yellowish, with two pairs of longitudinal blackish stripes, and a black spot between them; the claspers are yellow. After the second change, the caterpillar becomes a bright apple-green colour, still powdered with innumerable minute black points on the sides and claspers: the back is whiter green, with a narrow dark line down the very middle; there is a pale oblique stripe on each segment, bordered with darker green; the second, third and fourth segments have a whitish line on each side; the head has two blackish longitudinal lines on each side. The third change produces

little difference in colour. When full-grown, and after it has changed its skin four times, the caterpillar is 1½ inch long and very stout, its colour green, paler and whiter on the back, darker and richer on the sides and belly, where it is also thickly sprinkled with minute circular black dots: the spiracles are white, with a black edge; the head pale green, with four white longitudinal stripes, the outer ones broadest; a narrow dark green line runs down the very centre of the back: on each side of each segment is an oblique white stripe, bordered on each side with darker green; all these white stripes commence near the straight green line on the back, and each is continued faintly on the segment next to that which it adorns: on each side of each of the three segments nearest the head is another short raised white stripe: the twelfth segment has a hump on the back, ending in a short blunt white horn, which has a delicate black line behind; from this horn descends a short white stripe, and below the spiracle on the same segment is another white stripe bordered above with black. This caterpillar feeds only on the birch throughout May and June; it then descends the tree, and spins. The cocoon, or rather web, in which the larva effects its change, is attached to fallen leaves or twigs on the surface of the earth: some of the larvæ make shallow furrows in the earth, covering themselves above with a leaf; the web is made of brown silk, and is constructed like open net-work, so that water can freely pass in and out. The pupa is black-brown, and, immediately after changing, appears to be covered with a slight bloom, like that of a ripe plum; this appearance, however, gradually subsides, and in a few days has entirely vanished: the pupa is scabrous, the scabrosity consisting of numerous small and nearly confluent warts or pustules; on the case covering the antennæ these warts are arranged in regular series, and have a remarkable and very pretty appearance; on the hinder segments of the pupa these warts are changed into blunt spines or teeth: the caudal horn of the larva is still preserved in the pupa, is incurved, and beset with spiny warts which point outwards, the incurved apex being furnished with about twenty red-brown bristles.—*E. Newman.*

Notes on the Economy of Lepidoptera. — 1. Phtheocroa rugosana. May 25. Bred this insect from a very tough cocoon, fastened to the inside of my breeding-cage, by what larva I do not know. June 29. Took P. rugosana, beaten out of yew hanging over breeding-cage in which first specimen occurred. Query, did it come out of yew, and retire into breeding-cage, as it might have done through the chinks, to form pupa? Doubtless, as I find from Wilkinson, it feeds on Bryonia dioica, a plant of which grew under the yew tree last season and climbed among the boughs. 2. Diloba cæruleocephala. June 19. A larva has just made a papery cocoon in corner of cage, having helped himself to two F. nitidella cases, insects and all, wherewith to make it. Whether he ate the inmates I cannot say, but they never appeared in the perfect state. 3. Coleophora vibicella. July 5. At French Wood took a number of cases in pupa state, from some of which the moths were just emerging. I found the insect entirely confined to a warm south bank on the edge of the wood, where the food-plant grew stunted. I never saw it in the wood, though the plant was abundant, but of ranker growth. 4. Hyponomeuta evonymellus, H. malivorella and H. padellus. June 11. I have lately examined the respective larvæ of H. evonymellus and the supposed H. malivorella, or H. malellus (Stainton's 'Tineina,' p. 60). It is impossible to distinguish them by their markings, though one might fancy the latter rather yellower. I shut up some of H. evonymellus? (the spindle-feeder) for three days with apple leaves, from the same tree on which H. malellus was feeding; but they did not touch them. They both go into pupa about the same time.

July 6. Bred H. padellus from hawthorn; very common, and both larva and imago decidedly distinct from H. malellus, both being much darker. 5. Stauropus Fagi. August 8. My S. Fagi larva is now nearly full-fed. His attitude, when disturbed (one rarely sees him feeding at ease), is with head and tail meeting over back, and his long legs extended, sometimes with a vibratory motion, in front. The creature seems peculiarly unfitted to walk on a flat surface; it therefore attaches itself by its prolegs to a twig at the bottom of a leaf; then, holding the edge of the leaf at right angles to its mandibles by its long front legs, and beginning at the bottom, it eats its way towards the top, leaving the central rib of the leaf for a support as it advances upwards, till the whole side of the leaf is eaten. 6. Stenopteryx hybridalis. Sept. 15. Another S. hybridalis in hop-yard. The slow, weak flight of this insect, at this time of year, is very remarkable, as compared with the rapid, darting motions it makes in hot sunshine in the summer. The only other specimen I ever took in this neighbourhood was on the 20th of October, 1854. I have never seen it in the summer here, though it is so common in burnt-up ground on the coast. The habits of the two broods, according to my experience, are so unlike that I should be glad to hear more about the insect.—*E. Horton; Wick, Worcester, January* 23, 1860.

Companion Larvæ.—Some insects are never found *per se;* they are always in company with others; as, for instance, the ants'-nest beetles and the mysterious inhabitants of the wasp's nest. Many might have imagined that the character of "lick-spittle" was confined to the human race; but no, in this we have our corresponding types, clearly manifesting that we and other creatures of a far lower grade are (according to Darwin) descended from a common ancestor. It is well known that some of the "knot-horn" larvæ, such as Acrobasis consociella, A. tumidella, &c., make large habitations of a handful of oak-leaves, in which a whole brood live sociably together; it now appears that these insects keep companions, a Gelechia being attendant upon each gregarious "knot-horn;" thus, Myelois suavella is accompanied by Gelechia vepretella (*Zel. MS.*), Acrobasis consociella by a yet undetermined species of Gelechia, and a still unascertained larva of one of the Phycidæ, which abounds on hawthorn near Vienna has Gelechia spurcella for its hand-maid. Do these Gelechia larvæ feed on the "frass" of the Phycidæ?—*H. T Stainton; Feb.* 6.—'*Intelligencer.*'

On the Double-brood Question, as it affects Fidonia conspicuata.—My friend Mr. Greene appeals to me on this question, and I have much pleasure in stating that I do not think any subject in Natural History is better known than the economy of Fidonia conspicuata. There are two broods,—the first in May and the second in August,—and in the proper locality the insect may be taken in abundance at these seasons of the year. After the May brood disappears the larvæ may be collected in any quantity; they feed up and are in the pupa state by the beginning of July; from this state they emerge towards the end of July, and continue on the wing most of August. The larvæ feed up and go in the pupa state into winter quarters by the beginning of October, and re-appear the following May. I do not think any proper inference can be drawn from what takes place in the transformation of insects in the house; their changes are adapted for out of doors. I have at the present moment some of the beautiful hybernating larvæ of Limenitis Sybilla swinging in their snugly formed hammocks from the branches of the honeysuckle, as they were shown to me by Dr. Maclean, of this place. Now these little fellows, perhaps only a week old, will bear any amount of cold, but they die if confined in the coldest room of the house; so it is with the frequently observed and written-about changes of various insects.

Surely if insects are regularly taken in numbers at two distinct periods of the year the evidence is sufficient that they are double-brooded. The case of Gonepteryx Rhamni, in which the perfect insect may be taken in every month of the year, is one which fairly admits of argument, because Dr. Maclean and others who have closely watched the economy of the insect, say they are quite sure there is only one brood of larvæ in the year; but where the larvæ and the imagos are found twice there is, in my opinion, no room for doubt.—*C. R. Bree.*

Some Notes on Fidonia conspicuata.—I hasten to comply with the request of my friend Mr. Greene, that I should tell the readers of the 'Zoologist' all I know concerning the habits and transformations of Fidonia conspicuata, *W. V.* During two years residence at Stowmarket, in the neighbourhood of which town this insect occurs in some plenty, I had an opportunity of becoming tolerably well acquainted with its economy. Upon referring to my note-book I find the results of my observations to have been as follows:—

1857. May 11. Fidonia conspicuata flying sparingly.

May 19—27. Plentiful.

June 8. Not a moth to be seen.

Eggs laid May 22 hatch in about ten days, and are full fed and spin up the end of June.

July 19—26. Perfect insects keep appearing in my breeding-cage, and are flying in great plenty in the broom-field.

August 14. Beat a number of full-fed larvæ in the broom-field.

1858. May 4, 10 and 19. Fidonia conspicuata flying sparingly.

May 26—28. Abundant.

June 8. Have a number of young larvæ just hatched from eggs laid the end of May. Upon visiting the broom-field, a few days afterwards, beat a number of very small larvæ. At the end of the month find them all full fed.

July 15, 17. Perfect insect flying in numbers.

Middle to end of August. Find plenty of full-fed larvæ.

Mr. C. R. Bree, who lived for a number of years at Stowmarket, can testify that these results occur as regularly as clock-work every year, the time of appearance being slightly accelerated or retarded by the warmth or coldness of the season. The July flight is, as Mr. Bree most correctly states, much more plentiful than the one in May, and, as a general rule, the insects are smaller in size. As I could so readily take the perfect insect I never took much pains to breed it in confinement. In 1857 a few of the summer batch of pupæ did not emerge in July, but remained over till the following spring, but that, in my opinion, in no way militates against the fact of the insect being double-brooded. I am not going again to break a lance with my friend Mr. Greene on the field of double-broodedness. I have already argued the point at some length, both in the 'Zoologist' and 'Naturalist,' and the indefatigable exertions and perspicuous revelations of Mr. Gascoyne have unalterably fixed an opinion previously formed. I only wish to remark that I never asserted or contended that the whole of the summer brood of larvæ produced moths the same year (though Mr. Gascoyne's experiments show that this is frequently the case, and his experiments were made with larvæ kept out of doors and on growing plants). All I formerly contended

for, and what I contend for now, that if *any* part of the summer brood of larvæ produce perfect insects the same year, which pair lay eggs and produce full-grown larvæ and pupæ in the autumn, then the insect to which these results occur is double-brooded. For instance, F. conspicuata appears for the first time at the beginning of May; it lays eggs, and its progeny are full fed and spun up at the end of June. From these pupæ a number of moths emerge, pair and lay eggs from the middle to the end of July, and the larvæ are full fed the middle or end of August. *Ergo*, F. conspicuata is double-brooded. Mr. Greene contends that unless the whole of the summer brood emerge the same year the insect is not double-brooded; but this appears to me to be splitting a hair. Every one knows that in the case of acknowledged single-brooded insects,—*e. g.*, Smerinthus ocellatus and S. Populi, Sphinx Ligustri, Cerura vinula, C. bifida and C. furcula, Bombyx Quercus, Saturnia Carpini, Acronycta megacephala, Dianthæcia carpophaga, &c.,—several pupæ out of a brood will very frequently remain two years before emerging, yet no one would, on this ground, dream of contending that these insects were not annual-brooded. Whether an insect be single or double-brooded the appearance of all or part of those broods is a point upon which, I believe, no certain rule can be laid down. These matters are all directed by the masterly hand of an All-wise Providence, who so orders them that no vicissitudes of climate, temperature or weather has any serious effect upon the existence and continuance of a species.—*H. Harpur Crewe; Ivy Cottage, Wickham Market, Suffolk, February* 3, 1860.

Description of the Larva of Eupithecia castigata.—Long, slender and tapering. Ground-colour pale or dusky olive or reddish brown, with a chain of dusky lozenge-shaped dorsal spots, becoming confluent on the anterior and posterior segments. Segmental divisions reddish. Body thickly studded with minute white tubercles, and clothed more sparingly with short bristly hairs. Belly with a central blackish or purplish line running from tip to tail. Feeds promiscuously upon almost every tree, shrub and flower, in August and September. In almost every particular closely resembles the larva of E. vulgata. Pupa enclosed in an earthen cocoon. Abdomen slender and tapering, reddish or greenish yellow. Thorax and wing-cases yellow; the latter more or less suffused with green.—*Id.; January* 31, 1860.

Description of the Larva of Eupithecia minutata.—Short, thick and stumpy. Ground-colour dull pink or flesh tint, with a series of dusky Y-shaped dorsal spots connected by a central pink line, and becoming faint on the anterior, and almost obliterated on the posterior segments. Each dorsal segment studded with four yellowish tubercles. Spiracular line yellowish, interrupted at intervals by dusky blotches. Head dusky olive, marked with black. Belly dusky or pinkish white. Back thickly studded with small white, and a few black tubercles, and sprinkled here and there with short hairs. Feeds on the flowers of Calluna vulgaris in August and September, and is by no means uncommon where that plant occurs in any plenty. Pupa enclosed in an earthen cocoon. Short and thick. Thorax and wing-cases golden yellow; abdomen yellow, generally suffused with red. Wing-cases very transparent. Tip of abdomen blood-red.—*Id.*

Clostera anachoreta in the "Home Counties."—"Home counties" is the only locality I have ever publicly given for Clostera anachoreta, and the only one for which I will be responsible. The statement in the 'Annual' that I took it in the "neighbourhood of London" was published without my knowledge or sanction.—*H. G. Knaggs; 1, Maldon Place, Camden Town, N.W., January* 20, 1860.

Food of the Larva of Depressaria ultimella, Staint.—The larva of this species appears to be unknown. I bred a specimen early in June from a larva found feeding on the flowers of Conium maculatum, near Freshwater, Isle of Wight, last May; the larvæ were gaily coloured, and, judging from descriptions, must resemble those of Depressaria nervosa. Mr. Bond, who was with me at the time, saw them, but considered them to be those of D. heracliana. Perhaps this may serve as a hint to those who are looking for it, where to find it.—*H. S. Gorham;* 10, *Alfred Street, Montpelier Square, Brompton.*

Cryphalus Fagi, Fabr.—About Christmas, last year, I found several specimens of this species in the bark of a decaying beech near Westerham. With the exception of the specimen exhibited by Mr. Janson at the February meeting of the Entomological Society, I believe it has not been met with previously in Britain.—*Id.*

Capture of Diachromus germanus at Hastings.—A specimen of this insect was taken on the 25th of September, 1859, by Henry Case, Esq., in the neighbourhood of Hastings, and, through the kindness of Mr. Case, the specimen is now in my possession. I have little doubt that additional specimens may be secured in the ensuing season, if *power*ful efforts are made.—*Henry Adams.*

Facts connected with the History of a Wasp's Nest; with Observations upon the Parasite, Ripiphorus paradoxus. By S. Stone, Esq., F.S.A., &c. *

Observing a number of wasps entering an aperture in the ground, at Cokethorp Park, on the 25th of July, I revisited the spot in the evening, with the view of obtaining the nest. Accordingly, having taken the precaution to render the inmates insensible, by pouring a wine-glass full of spirits of turpentine into the aperture, which was then closely stopped up with clay for a short time, I proceeded to dig it out. In doing this, so hard and dry had the ground become that I broke the covering to pieces, displacing and scattering the combs. Finding that I had utterly ruined the nest as a specimen, I determined, at any rate, on securing the combs; I therefore began to collect them, and, placing them singly on the floor of the vehicle in which I had driven to the spot, brought them away, unaccompanied by a single wasp, the whole number, including of course the foundress of the colony, being left behind. The nest was one belonging to Vespa vulgaris, and being composed of decayed wood its destruction was the more complete, for so fragile are nests of this species that even a touch of the finger, unless extraordinarily light, is fatal to their beauty.

* Read before the Entomological Society of London, November 7, 1859.

On reaching home I passed a wire through the centre of each comb, just as people are in the habit of filing bills, placing between the several tiers, by way of supporting columns, small fragments of Celtic pottery I had obtained in prosecuting some archæological researches in the neighbourhood, and which happened to be the most convenient material for the purpose I could at the moment lay my hands upon. Having so done, I suspended this archæo-entomological specimen near the window of a room in which I had established a working community of the same species of wasp, procured on the 24th of June, when a body of workers at once passed over, and the next morning were found to be busily engaged in feeding the larvæ the combs contained, and in the construction of a fresh covering. In the course of a week the combs were completely enclosed. In a few days after this Mr. Douglas's note on parasitic beetles appeared in the columns of the 'Intelligencer;' and on the 10th of August I forwarded to that gentleman, for identification, a specimen of Ripiphorus paradoxus I had obtained in the immediate vicinity of the nest above-mentioned, and in which it had doubtless been bred.

On the morning of the 15th of August I was watching the progress of the work, and, in order to be enabled to do so the more narrowly, was holding the nest in my hand by the wire which supported it, when a second specimen bolted out, followed immediately afterwards by another. As Mr. Douglas had stated that it was desirable some observations should be made upon the habits of these parasites, if an opportunity of doing so presented itself, I thought now was the time; so I contrived to rid the nest, there and then, of the more active wasps it contained; and, taking it into an adjoining room, proceeded to denude it, with the aid of a pair of scissors, of its recently-formed covering. While preparing to perform this operation, as well as while it was being performed and for some time afterwards, the parasites continued to emerge at short intervals; so that between the hours of 10 A.M. and 2 P.M. twenty-eight specimens had made their appearance.

This nest, be it observed, had been removed from its original situation exactly three weeks; consequently all the eggs (I am speaking of those of wasps) deposited prior to that event must have produced larvæ, the larvæ must have all become full-grown and spun up, while such as had made any progress in their growth at the time the nest was removed must have undergone their final change into perfect wasps. Great was my astonishment, then, on removing the covering, to find the cells containing not only larvæ in every stage of their

growth, but eggs also in vast profusion. All the larvæ that had attained anything like their full size, or even half their full size, were found to occupy each a separate cell, as is observed to be invariably the case in all well-ordered nests, the parent wasp depositing only a single egg in each cell; but in the present instance, where the larvæ were minute in size, groups of three, and even four, apparently varying slightly in age, were located in one cell. Some of the cells contained an egg and one or two small larvæ; and some, two or three eggs, a single egg in a cell being of rare occurrence. Many of the cells had been almost demolished since the nest had been removed from under ground, the walls having been gnawed away nearly down to their base; yet they contained eggs or small larvæ. That the larvæ were those of wasps (I had a faint hope they might have turned out to be those of Ripiphorus) the testimony of Mr. Douglas, to whom some were sent for examination, proves beyond a doubt. It may be well to remark that no additional cells had been formed in any of the combs since their first removal.

Neither among the wasps driven out of the nest before the covering was removed, nor among those found to be congregated between the combs after it had been removed, was one single individual observed larger than a full-sized, plump worker; nor, indeed, was it to be expected, for it was at far too early a period in the season for the young females, which are destined to become the foundresses of colonies in the ensuing year, to have made their appearance; nor could the presence of a single male be detected; and as the cells contained, as before stated, larvæ in every stage of their growth, as well as nymphæ in every stage of their advancement toward the perfect state, it is obvious that since the removal of the nest from its underground situation the process of egg-depositing must have been going on from the first, at which period it is certain none but workers could have been produced in any nest of this species. It must, therefore, have been by one or more individuals of this class that these fertile eggs were produced!

I may be allowed to cite two or three additional instances bearing upon this subject.

In a paper upon wasps, by Dr. Ormerod, of Brighton (Zool. 6641), mention is made of a nest of Vespa britannica (norvegica, *Smith*) having undergone three removes. On its first removal the stragglers, four in number, among which, the writer remarks, "no wasp distinguishable by her larger size could be seen," set about the construction of a fresh nest, which in the course of ten days was found to

contain a small comb, consisting of eight cells, " with distinct eggs in them." These eggs, it appears, came to nothing when the nest was sent to the writer, at Brighton,—a circumstance doubtless arising from some cause connected with its removal. On the original nest being removed a second time, it is stated that the stragglers, which were more numerous than on the former occasion, built another. This in the course of two or three weeks was found to contain " two tiers of cells, the upper one full of grubs."

On the 12th of last July I dug out a nest of Vespa rufa. It was situated in the deserted burrow of a mole. The parent wasp and a few of the workers were brought away with it, while the rest, about thirty in number, were left behind. These were soon observed to be busily engaged in constructing a fresh nest in the same burrow, and close to the spot from which the former one had been removed. On the 26th I took possession of this nest, which measured about $1\frac{1}{2}$ inch in diameter, and contained a small comb of an irregular shape, the cells in which numbered thirty-two, some containing eggs, and some small larvæ. The covering of the nest was at least four times the thickness one of the same size, constructed by a single female, would have been. None but wasps of the ordinary size, or those commonly known as workers, were found to be connected with it.

Now, although these facts may not amount to absolute proof, do they not point to the probability that, in colonies of wasps, the workers, or imperfectly-developed females, may become so far developed as to have the power of producing fertile eggs, and that without previous connexion with the male sex? This further development, however, does not ordinarily take place, occurring only when some extraordinary circumstance has arisen which renders it necessary or desirable.

I must now return to the parasites, which, as already stated, continued to emerge from the cells after the covering of the nest had been removed.

The lower comb contained twelve covered cells, and to these my attention was principally directed, in consequence of the cap or covering of each appearing to me to be more pointed in form than those usually spun by the larvæ of wasps. Presently I observed a pair of jaws, from the inside of one, running rapidly round the crown, and cutting a circular piece not quite out, but sufficiently near to enable the insect, which proved to be a specimen of Ripiphorus, to effect its escape by pushing up the piece it had cut, and leaving it like the lid of a vessel attached by a hinge, just as the

great saw-fly operates upon the top of its cocoon. On a close inspection of the interior of the cell after the insect had quitted it, I could detect the presence of nothing to indicate that the parasite was not the original, or had not been the sole, tenant. This fact, coupled with the pointed form of the covering, led me to think it not improbable that an analogy might exist between the habits of this parasite and those of the cuckoo,—that as the egg of the latter is palmed off upon the unsophisticated, unsuspecting wagtail as one of her own, so might those of the former be palmed off upon the nursing wasps as genuine eggs of their own species; and that the larvæ might be nursed, tended, fed and brought to maturity by the attendant wasps, just as the dupe of a wagtail brings to maturity the young cuckoo.

Unaware that this idea had been entertained by any one previously, I mentioned it in a note to Mr. Douglas, who informed me that Latreille had inferred as much from observations he had made. Had my attention been directed to the subject at the time I first obtained possession of this nest, I should doubtless have been enabled to prove the soundness or unsoundness of the above conjecture; as it is, the question must remain an open one till another year, when I hope to have an opportunity of deciding it.

The parasites betake themselves to flight, leaving the nest in all haste the moment they have freed themselves from the cells, as though afraid to prolong their stay among those upon whom they have so long and so successfully imposed, now that they have thrown off the cheat and appeared in their true colours. How the parent insects contrive to enter the nest with impunity, and deposit their eggs without molestation (always provided they do enter it for that purpose), is a point upon which renewed observations, made at an earlier period in the season, may possibly throw some light. It may probably be found that they do not actually enter the nest, but content themselves, like Sitaris, with depositing their eggs somewhere in the immediate vicinity, trusting, as Sitaris does, to the exertions of the larvæ to gain access to the cells in the best way they can; and when the latter have done this there are two courses open to them, one of which it is clear they must pursue: they can either select a cell containing an egg, which they can first coolly despatch for breakfast, as it appears the larvæ of Sitaris do, and then pass themselves off as wasp-larvæ; or they can look out for one containing a larva, into whose body they can enter, and upon which they can feed till their change comes, as the Ichneumonidæ do upon the bodies of

lepidopterous larvæ. Which of these two courses is pursued by them remains to be discovered. Their hours for emerging seem to be restricted to a certain portion of each day; for during the time I was almost exclusively engaged in making observations upon them, a period extending over five days, none made their appearance before about ten o'clock in the morning, nor after about four in the afternoon; while between those hours a considerable number were produced each day.

The specimens, sixty in number, obtained on the first and following day, were placed with all possible care—as soon as they had left the nest, and with a sort of flying leap had alighted on the window—in a gauze bag, in which they were confined for a time. From the bag they were carefully removed, and placed in a bottle containing bruised laurel-leaves, and from the bottle transferred to a tin box, in which they were securely packed and sent to Mr. Douglas. They reached their destination in perfect safety; but, upon examination, nearly one-third of the whole number, and those, with two or three exceptions, females, were found to have a deficiency in the proper number of legs; and although diligent search for the missing articles was made, both in the window, the bag and the bottle, no trace of them could be discovered. If therefore they brought the full complement of legs into the world with them, how is their disappearance to be accounted for?

Neither on their first emerging, nor during the period of their confinement in the bag, did the sexes take the least notice of each other, thus following the example of the inhabitants of the nest among whom they had been brought up. In the case of both these insects it seems absolutely necessary that the air of heaven should fan their love into a flame before it will burn, since, so far as I have been able to observe, copulation never takes place, either among wasps or their parasites, till they have taken their flight from the nest, never more to return to it. In this respect the habits of Ripiphorus contrast strongly with those of Sitaris; the cause of which becomes apparent on comparing the history of the two insects upon which they are parasitic, instinct teaching the latter-named parasites that they may safely deposit their eggs at once, and in the very spot in which they have themselves been reared; for that the bee of the following year will not fail to construct her cells upon the self-same spot,—a spot which has been the birth-place of the species for ages past, and which will in all probability continue to be so for ages to come; while it points out to the former that they cannot deposit theirs, with any possible chance of

success, till the following summer, when the insect upon which they are parasitic has not only selected a place in which to build, but has made some progress in the work of building, it being most uncertain in what precise locality the wasp may construct its nest. It may be somewhere not very remote from the spot chosen by its predecessor; but it will be by the merest accident if the nest is found to be placed so near the cavity in which that of the previous year was situated as to be accessible to larvæ produced from eggs deposited in that cavity. Whatever, therefore, the males of this parasite may do, the females must of necessity hybernate.

I have already stated that my observations upon these parasites, at the time they were emerging, extended over a period of five days. During the latter part of that time the combs in which they had been bred were kept suspended under an aquarium-glass, food being placed near the combs that the attendant wasps, which were congregated between them, might be enabled to feed the larvæ the cells still contained,—a task they continued unremittingly to perform, without evincing any great desire to escape from their confinement.

On concluding my observations upon the parasites the combs were returned to their place near the nest from which they had been removed, when numbers of workers belonging thereto were again observed to be employed in the fabrication of a fresh covering, to which daily additions were made for several weeks, the utmost activity prevailing during the time, and the nest becoming more and more populous. Toward the end of September, however, the work became slack, the workers having fallen off very considerably in number. On again removing the covering, which was done early in October, a few eggs and a few spun-up larvæ or nymphæ were the only objects the combs contained. Most of the cells had been cleared out, and their walls well nigh demolished, while no additional ones had been formed since the first removal of the nest, on the 25th of July.

It may be worthy of remark that, from first to last, not a single male appeared to have been produced in this nest; at any rate I never observed one.

S. Stone.

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*On the Transverse Fission of Aiptasia Couchii.**—As I do not find anything in the history of Aiptasia Couchii in your 'Actinologia Britannica' concerning its system of increase, the facts I can communicate may be of interest. About the end of last

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* Extracted from a letter to P. H. Gosse, Esq., F.R.S.

March I was favoured with three specimens of this species. In August I was astonished to find a *fourth*, in a closed condition, too large to have been produced from ova or discharged as perfect young, or to have escaped my observation for any length of time. A few days after this I discovered a second grown specimen, in the process of division; the skin of the lower portion of the column appeared ruptured, revealing a bundle of white threads quite tense. For the moment I felt alarmed for the welfare of my favourite; but the unaccounted-for presence of the fourth specimen led to the conclusion that the process of division was going on. A few hours after, the upper portion, with the disk, which during the whole process was expanded to the utmost, moved off, leaving the old base, with a portion of the column, to form a new animal. For some days the bottom of the column of the old specimen [the separated portion] looked like the broken stem of a plant with numerous ragged ends of white fibres hanging about; it however healed in time, returning to its former state. Immediately after the division the new animal, *i. e.* the [moiety which possessed the] old base, closed over perfectly the ruptured integument, and showed little signs of life for ten or twelve days; gradually, however, it formed a new disk and minute tentacles. Three weeks after, it had a well-formed disk and long tentacles. Within a few days of the same period the *third* specimen also went through the same process, but the ruptured integument of the old base [*i. e.* the new animal] never healed; it lived many days in a restless state, and then died. The three old specimens * recovered, and, together with the two young, which have grown, and show all the characteristics of the old ones, are in good condition at the present time. I was at the Zoological Society last autumn, and was there shown two small Aiptasiæ which the keeper informed me had been produced from ova. The transverse division of the whole column was so new a fact to me that I intended putting you in possession of the facts long ago, in case you might have thought them worthy of note in your valuable work now completed; probably, however, ere this you have been made acquainted with similar facts, or they may have occurred under your immediate notice.—*F. N. Broderick; Ryde, Isle of Wight, January* 2, 1860.

The Stoat (Mustela erminea) *in its Winter Garb at Selborne.*—A kind neighbour of mine brought me, on the 27th of last month, a stoat which he had shot on Selborne Common, which had assumed almost completely the northern winter garb of the ermine, the only remains of the ordinary brown being partially on the head and on some portions of the anterior part of the body; the whole of the hinder part, including the tail, being as perfect ermine as any lady could desire for her muff or a peer for his Parliamentary robe. This is a rare, but not an unprecedented, occurrence in this latitude, as I find in my notes the following passage:—"An intelligent labourer here has assured me that he has repeatedly killed the stoat in its pure white winter dress at Selborne. He has also found it in the pied transition state."—*Thomas Bell; January* 7, 1860.

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* It must be borne in mind that my correspondent applies the term "old" to those animals which retain the original *disk*, and "young" to those which have formed a new disk.—*P. H. G.*

Distance Swum by Red Deer.—On the 27th of October last a red-deer stag, of four points, landed on the north side of the Island of Muck, one of the Inner Hebrides, belonging to H. Swinbourne, Esq., R.N. The shepherd's family were startled by his belling. Unfortunately his dogs broke out, and chased the poor animal all night. In the morning he was found dead, though warm, his gallant heart being, as it was expressed, broken. He must indeed have been a noble animal to face the swim he so successfully, though unfortunately, accomplished. The nearest places on which red deer are kept are—the Island Rum, belonging to the Marquis of Salisbury, about ten miles distant; and Arasaig, belonging to Mr. Astley, about twelve miles distant. There are also red deer in the Island of Mull, more than twelve miles distant; but he could not have come from thence, as there was a strong wind right against him. From either Rum or Arasaig he might have shortened the distance by landing on the Island of Eigg; but Muck is two miles from Eigg, and Eigg is six miles from Rum and eight from Arasaig, and from either he must at all times have had a strong side-tide against him. The distances are local estimates, the existing charts being considered incorrect, and since hearing of the above I have had no opportunity of consulting them. I should be glad to learn well-authenticated instances of the distances stags have been known to swim. The late Colin Campbell, of Jura, mentioned to me that he believed there was a well-authenticated tradition of a stag having swum from Jura to the mainland, a distance of seven miles. The above I had from Mr. David Thornburn, the intelligent tenant of the island.—*William Robertson; Kintockmoidart, Inverness-shire.—From the 'Field.'*

New Mode of preserving Fossil Elephants' Tusks.—In No. 366 of the 'Field' there is mention made of the common occurrence of elephants' tusks, in all parts of England, in a fossil state; and a lamentation that only portions of tusks are seen, as the workmen in moving them break them to pieces, they being so brittle on account of a great portion of their animal constituents having been destroyed by the action of air and moisture, and only the mineral remaining. Now, if any of your readers should find a fine tusk, he may restore its hardness, partially, by pouring upon it a solution of glue (which the ivory sucks readily up), and by repeating this process the tusk will be most wonderfully restored both in appearance and strength.—*R. H. T. Gilbert; Kensington.—Id.*

[The exquisitely-carved ivory tablets obtained in a crumbling state from the ruins of Nineveh were perfectly restored and preserved, at the suggestion of Prof. Owen, by soaking them in a solution of gelatine at a temperature of 120°. They have thus become hard and perfect ivory again.—*Edward Newman.*]

The Stoat in Winter Dresss.—At the last meeting of the Zoological Society, Dr. Crisp exhibited a stoat in perfect winter dress. It had been killed in Suffolk. The change of colour here was more complete than in Mr. Bell's specimen, but the animal had been captured in a more northern county.—*E. W. H. Holdsworth; March* 7, 1860.

Birth of two Bears at the Zoological Gardens, Regent's Park.—It is a very rare thing indeed that bears breed in captivity; and it is therefore with great pleasure that, through the kindness of the energetic and able Secretary of the Zoological Gardens, I am enabled to place on record the birth of two young bears on the Society's premises. In the bear-pit at the Zoological Gardens there are three bears,

viz., two females, one a brown European, the other a black American specimen, the male being also American. The mother of the cubs is the European bear, and they were born at the end of December last. At the time of birth, and for some days after, these curious little wretches were not larger than common rats, and their growth advanced very slowly; at their death, a few days ago, they were not much larger than a good-sized rabbit, but yet exceedingly vigorous, strong little rascals. The bear who had not young ones assisted for some time the mother in the care of her little family; but, thinking she might maltreat and injure them, the keeper shut her out of the den where the nest was made. She managed, however, to scratch under and push up the heavy iron grating, and, getting in to the cubs, killed both and partially devoured one, to the great grief of their mother and of all those who had seen them alive and well. Mr. Bartlett, the intelligent and obliging Resident Superintendent at the Gardens, has made close observations on these young bears, and read a paper upon them at the Zoological Society, Hanover Square. He stated that he has ascertained that the period of gestation is seven months, and that the animals are born towards the end of December. Now, in a natural state the mother-bear would at that time of year be in a state of hybernation, shut up snug and warm in some snow-covered cave, with very little food or nourishment, if indeed any at all. In captivity the nature of the animal is not changed, for Mr. Bartlett has observed that even before the birth of the cubs, and during the period the mother was suckling them, she took very little nourishment at any time. Coupling this fact with the remarkably small size of the animals when born, he imagines that bears naturally bring forth their young during the period of their hybernation, — a period when the mother is exceedingly fat, the milk being derived from the accumulation of fat which the bear always manages to pile up under her fur-clad skin before she goes into winter quarters. As regards this subject, the Rev. J. Wood, in that most interesting and carefully-written work, 'Routledge's Natural History,' when speaking of bears, writes as follows:—"The bear-cubs make their appearance at the end of January or the beginning of February; and it is a curious fact that though the mother has been deprived of food for nearly three months, and does not take any more food until the spring, she is able to afford ample nourishment to her young without suffering any apparent diminution in her condition." Mr. Bartlett has also ascertained a curious fact relative to the position of the teats in the mother-bear. There are six of these teats altogether; they are not placed upon the abdomen, but four upon the breast (upon the pectoral muscles between the fore legs or arms) and two on the lower part of the body (between the hind legs, in the same place as the udder of a cow is found). There is doubtless some good reason for this curious disposition of the teats, and it must have some relation to the habits of the animal in its wild state. It is just possible that this may be read by some gentleman who has hunted or observed bears in their natural wilds, and if he could kindly communicate his observations he would greatly oblige many persons who are interested in the matter. — *F. T. Buckland, in the 'Field.'*

Notes on the Duckbill. By George Bennett, Esq., F.Z.S., &c.*

On the morning of the 28th of December, 1858, I received a male and female specimen of the Ornithorynchus, alive; the male very large, and the female much smaller; they had been captured four days before the opportunity occurred of sending them. They were packed in a box with straw, carefully and securely fastened down; they had burrowed into the straw, and seemed warm and comfortable. When taken out and placed in a tub of water, they were very lively, diving down and remaining out of sight; and were so timid that when reappearing it was only to place the end of the mandibles out of the water to inhale some fresh air, when they would speedily disappear again, seeming to be perfectly aware they were watched. The longest time this animal could remain under water, without rising to the surface to breathe, was full 7 minutes 15 seconds, by the watch. I placed them in the evening in a tub of water with turf and grass; they remained quite tranquil, bubbles of air rising occasionally to the surface of the water alone indicating their position, with a movement as if they were shifting their place in the tub, but without showing the body. After some minutes had elapsed, the tip of the black snout would appear on the side of the tub, to the length of about an inch, or just sufficient for the nostrils to be above the surface of the water, they being at the same dilated as if to imbibe a supply of atmospheric air. They would only remain a few seconds, when they again speedily disappeared. When watched at a distance, one was seen to crawl out from the tub and escape upon the ground, but it was speedily captured and replaced. After leaving them in the water for about an hour, I placed my hand in the tub and took them out, and on replacing them in the box they soon burrowed down in the straw.

They are, as may be expected, fond of darkness and concealment, and dive under water or burrow under ground, coming to the surface to feed and enjoy themselves, principally at the dusk of the evening or at night.

I do not believe that the duckbill has ever been found in South Australia, no specimen having yet been brought from that locality.

These animals are rather crepuscular in their habits, sleeping for the most part of the day; and in captivity I have always found them very annoying at night, disturbing the rest of every one within hearing, by the scratching and restless noises which they make in

* From the 'Proceedings of the Zoological Society.'

their vigorous efforts to escape; whereas in the morning they will be found rolled up and fast asleep. Still I am now of opinion that all the Australian crepuscular and night animals,—judging from those I have been able to observe in captivity,—although very active, and feeding principally at night, will leave their places of concealment during the day, for a short time, for the purpose of feeding.

The male animal, as if to keep up its bird-like character, has a spur, moveable, like that of the barn-door cocks. This is found also in the Echidna, or porcupine ant-eater, another of the monotrematous family; but, judging from experiments on both animals, cannot be considered a weapon of offence or defence, and is for some purpose in the economy of the animal at present unknown to us. From my recent observations I consider the question of the spur in the male being a poisonous weapon as now decided; for the living male specimen, though very shy and wild, can be handled with impunity. Although making violent efforts to escape, and even giving me some severe scratches with the hind claws in its attempts, still either in or out of the water he has never attempted to use the spur as a weapon of offence. Indeed, the scratching I have before alluded to has not been done by the animal intentionally, as it is to all intents and purposes perfectly harmless; but accidentally by the hind claws, which alone are sharp, in the efforts made to extricate itself from my grasp. The female will float feeding upon the water, and is much tamer than the male. The latter keeps swimming about below, and it is a long time before he ventures to put more than the snout above the water, and then rarely more than the head and a little of the upper part of the body.

From the 29th to the 31st of December they were lively and well. I placed them for one or two hours in the water morning and evening, to feed and wash themselves, which they appeared to enjoy exceedingly. I placed some meat minced very fine in the water to try to feed them, so as to send them alive to Europe, as I considered the manner of feeding them an important preliminary step to ascertain. In their natural state they evidently feed in water. Just before I took them out in the evening they had burrowed to the bottom of the box, among the straw, very warm and comfortable, and they were cuddled close together.

On the third morning I found them much tamer, and, instead of diving down immediately they were placed in the water, they floated upon the surface. The female would permit me to look close to her little twinkling eyes; her ears were always much dilated, and she

would remain tranquil even when I touched or scratched her head or back; but the instant I touched the sensitive mandibles she would either dip down partially or disappear altogether under water for a short time. The male is evidently much more timid. I have only once seen his body on the surface of the water; and when taking him out of the water and replacing him in his box, I found great difficulty in capturing him. The female, being generally upon the surface, is secured and placed in the box very easily, but the struggles of the male are very great, and this makes it more difficult to take him every time. The female paddles about on the surface, and occasionally performs summersaults in the water; the male sometimes comes up, but dives rapidly down again. The female floats upon the water without any apparent paddling, and remains in a sort of half-immersed position for a great length of time, with the beak lying flat upon the water. If any dust comes near the sensitive nostrils, a bubbling of water is seen to issue from them, as if to drive away the irritating substance; and, if this does not succeed, the beak is washed in the water to remove it.

January 1st, 1859. Both the animals this morning had a sleek, healthy and lively appearance; they did not require to be taken out of the box to be placed in the tub of water, but ran in themselves as soon as the lid of the box was opened. On entering the water they turned and gamboled about, and then reclined on one side, scratching themselves with the hind claws. They would permit me to touch them without being disturbed; indeed, they had become so tame as to allow me to tickle and scratch them gently, and appeared to enjoy it very much. They generally remained half-submerged in the water; it is only when touching the sensitive mandibles that they would dive down, but even then they would not remain long under water. Their favourite position was half-submerged, with the mandibles resting down upon the surface of the water.

The female is languid and weak, but the male continues vigorous, diving and swimming about. When in the water they play together, occasionally tumbling one over the other, and then remain on the surface of the water, gently combing their fur. No attempt was ever made (even when he growled at being disturbed) by the male to injure or even scratch with the spur. When I took the male out or disturbed him at night, he growled, and afterwards made a peculiar shrill whistling noise, as if a signal call to his companion. It is principally in the evening and at night that these animals are in the habit of coming out of their burrows to sport and feed both in the water and

upon the banks. On retiring to their burrows to repose, they roll themselves up like furred balls.

January 2nd. The female appeared quite exhausted this evening. On being placed in the water, it paddled feebly about, and then, dropping its head, sank. On removing it I found it was dead. It appeared, on examination, to be in poor condition.

January 3rd. The male does not appear to be thriving, but I have now a large tub prepared for his reception, in which I have made the following arrangements. The tub is 3 feet 6 inches in length by 1 foot 9 inches broad, and 2 feet deep. At one end I have had a wooden enclosure made, which was partially filled with earth and a sprinkling of straw; this attempt to imitate the burrow was 12 inches deep and 15 inches in length. I then placed sand from a pond a few inches deep in the tub, in which I planted some fresh plants of Damasonium ovatum and other river plants from a pond in the Botanic Gardens. The tub was filled with water up to an inclined plane, which was turfed like a bank; a level space was also left, on which turf was placed, so that the animal might repose and clean himself on emerging from the water. On placing the male into it he dived down and seemed to enjoy himself very much. He was still lively, lying upon the surface of the water, and scratching himself, and again diving and swimming among the weeds; he then went upon the level bank and again plunged into the water: after remaining there for nearly an hour, sometimes upon the surface, and often for a long time under water, he found his way into the burrow, where he remained. I covered the whole of the cage with zinc wire, by which means he had light and air, and we could observe all his actions. This was to prevent his escape, as he could readily have climbed up the surface of the tub. There are openings at each end of the cask, by which means we could draw off all the dirty stagnant water and replace it with clean as often as was required. I fed the animal on meat minced very small, and then thrown into the water.

Both of these animals were captured in a net. The man who took them stated he had kept two alive for fourteen days, feeding them upon river-mussels, which he broke and gave them in the water; that they seemed to thrive very well; and that he supposed that they fed upon these mussels, as they had been in good health, their death having been occasioned by accident.

It surprises many why these animals, when captured in a net and left all night, are found drowned in the morning. It is my opinion that when one of these animals is captured in a net (as was the case

with a male specimen taken in that way a short time since in the Mulgoa Creek, and found dead in the morning) it is entangled in the meshes, and, being unable to rise to the surface to breathe, is drowned.

January 5th. Last night I observed the animal emerge from the water and enter the burrow; this was about 11 P.M. This morning I did not see him in the water; he appeared yesterday evidently drooping and sickly, and I fear we have not yet got into the method of feeding them. Their food being minute and delicate it requires some experience to give it to these peculiar animals successfully. On opening the burrow the animal was not there, and on drawing off the water we found him stiff and dead at the bottom. Having, no doubt, been too weak to regain the burrow he perished when in the water. Thus ends the first experiment of keeping duckbills alive.

On dissection I found that they had been starved; there was no food or sand either in the intestines or pouches, nothing but dirty water. Should I procure other specimens it is my intention to introduce into my tank river-shrimps and insects of different kinds previous to placing them in it, so that they may obtain a sufficient supply of their natural food. Still all this will increase the difficulty of taking them to Europe, as the supply cannot be kept up at sea. They evidently are very delicate animals, and life is soon destroyed if nutriment is not rapidly kept up. The specimens were not emaciated in body before they died.

The testes in this male were very small, not being larger than peas. The animal was full-grown, and of the size of the largest specimens usually seen.

Sometimes I have seen the male with the spur so far thrown back and concealed from view as, at a glance, to be taken for the female, and when opened for anatomical examination to be mistaken for one, so that it is not improbable that the large testes resembling pigeons' eggs may have given rise to the notion of the animal laying eggs.

I have no doubt that the duckbills make their burrows high in the banks, so as to be out of reach of the floods which occasionally prevail. Although amphibious in their habits they require to repose on the dry land, and also to breathe atmospheric air at short intervals of time. Did they not adopt some plan of the kind, they would be destroyed or drowned in their burrows by the floods.

Another very young specimen was kept for three weeks, and fed upon worms; it had a rudimentary spur; it was very tame and easily fed by hand; it died on the 7th of February, and was preserved in spirits.

The plan I propose, besides introducing shell-fish, &c., is to feed them, in captivity, upon worms, and, if we succeed in keeping them alive in Sydney by that method for three months, to send them in the place of confinement, arranged as before described, to England, keeping them upon the same diet. At all events it is worthy of a trial; and, on quitting Sydney, I left the artificial burrow and other preparations with a person interested in the subject, in order that he might try the experiment.

I have remarked that when healthy these animals, on emerging from the water, are in the habit of cleaning and drying their fur, and seem to pay great attention to their being in a clean and dry condition, and appear also to be fond of warmth. Not long previous to the death of both these animals, I remarked that they did not dry or clean their fur, and I have no doubt that the chilliness produced by that circumstance accelerated their death, as the body—more especially in the male—was not so emaciated as would have been the case had death ensued from starvation.

The Two Jackdaws.—In the summer of 1858 my friend, Mr. King, of Melbourne, procured four jackdaws from four different nests, wishing to keep one only as a pet. Three of them were reared, one of which was presented to a neighbouring clergyman, another to a gentleman who lives on a farm on Melbourne Common (a lonely spot, probably a mile distant), and the third he kept for himself. The latter (a male bird) remained quite contented with his situation for about three weeks, at the end of which time he frequently absented himself towards the middle of the day, but came back to roost. This he continued to do for perhaps three weeks longer, when he was missed altogether. Some time afterwards tidings were obtained of him, and, singular to say, that, having crossed Melbourne Pool and a somewhat peculiar kind of country, he had made his way to the farmhouse on the common, and taken up his quarters with the other jackdaw, his old companion, who, by-the-bye, happened to be an individual of the "gentler sex." The two remained at the farm all winter, coming into the house, feeding together, and being very tame. In the spring of the ensuing year they paired, and at last built a nest in the dovecote, where the female would have laid (for the eggs in the ovarium were considerably advanced), but unfortunately, whilst feeding one morning with the fowls, a domestic hen (which had chickens, not liking the colour of Mrs. Jack's cloth) set upon and killed her. The cock still remains in his old quarters alive and well.—*From the 'Field.'*

The Magpie Nesting in Confinement. — A curious circumstance occurred at Barrow-on Trent, in Derbyshire, one of the very few instances of the magpie breeding in confinement, more especially in the manner described. Two persons in that village had each a tame magpie, one was a male, the other a female. It was agreed that a matrimonial alliance should take place between them, and consequently they were in due time introduced to each other. With a coyness becoming her sex, Miss Magpie

received the attentions of her amorous suitor; but gradually her shyness wore away, and the pair were duly smitten with each other, or, in bird *parlance*, "paired." The birds were usually confined in a large wicker cage. As time wore on, Mrs. Magpie wished to take upon herself the duties of a family, and both birds commenced building a huge fabric of sticks within the cage. They went into the neighbouring gardens and fields and collected mud and sticks, which they brought to it; but a difficulty sometimes presented itself; the brought materials proved too large for admission into the cage. Bird ingenuity, however, suggested many novel devices to accomplish the end, and when not successful the owner of one of the birds gave them a little assistance. At last the roof-tree was put to the fabric, and it was "papered" with the most approved ornithological lining. Mrs. Magpie then deposited four eggs therein, two of which were duly hatched, and the young reared. But the fate of most pets awaited them; being guilty of numerous breaches of the correct principle of *meum* and *tuum*, they were brought to trial, and finally condemned to forfeit their lives for their offences—an unfortunate termination to a pretty ornithological drama. —*Id.*

Ornithological Notes from Norfolk : unusual Number of Hawfinches.— These singular birds have visited us, during the late severe weather, in far larger numbers than I have ever known before. Every winter brings a few specimens to be classed amongst the rarer visitants during frost and snow; but since the first week in December, 1859, I have seen upwards of thirty hawfinches, most of them in beautiful plumage, at one bird-preserver's in this city, brought in, from time to time, from all parts of the county. Besides these I have heard of several others that have been noticed frequenting lawns and gardens, exhibiting during the intense cold but little of their peculiar shyness, and happily escaping that indiscriminate slaughter which must have sadly thinned their ranks. The kingfishers in this neighbourhood have also suffered severely this season. During the intense frost between the 12th and 24th of December, when the rivers, drains and water-courses of every kind were thickly frozen, more than twenty of these beautiful little creatures, from one locality only, were brought into Norwich to be stuffed. Most of them were shot close to the water-mills, where the open water caused by the action of the flushes afforded the only chance of obtaining their finny prey; and several were picked up dead on the ice, frozen hard and stiff, and apparently starved to death. In one instance a kingfisher was seen to pitch down close to the bank of the river, and, rising again, fly off to a rail close by. The person watching this bird saw it attempt to swallow something, when it suddenly fell over backwards and was picked up dead. On being examined afterwards it was found to have bolted a small black shrew, which unusual morsel had evidently caused its untimely end, but showed how hard pressed these poor birds must have been for their natural food. The large number thus met with in one district is accounted for by the migratory arrivals that undoubtedly occur on our coasts during the autumn and winter. I have not heard of any more waxwings since my last notice, and have only heard of one small flock of crossbills having been seen, of which a pair were shot on the 5th of January. During the heavy gales in December several little auks were picked up dead in various places along the coast, but none, as is sometimes the case, far inland. A few days since, however, a solitary dunlin sandpiper was picked up dead under the telegraph wires at Cringleford, about a mile and a half from Norwich. This wandering Tringa, thus strangely out of his latitude, was probably dashed against the wires during the gale, having been carried away more than

twenty miles from its natural haunts by the sea. A fine adult male of the black-throated diver, with the throat white, was shot on Barton Broad about the 28th of January, and two or three redthroated divers, but all immature, have also occurred. A female redbreasted merganser and three female goosanders appeared about the same time, but no male birds of either species have been met with to my knowledge. — *H. Stevenson ; Norwich, February* 16, 1860.

Wood Pigeons in Paris. — During a fortnight's visit to Paris, in November last, I was rather surprised to find that wood pigeons frequented the gardens of the Tuileries in considerable numbers. Every evening, from my rooms in the Rue Rivoli, I saw from ten or a dozen to about twenty birds on some three or four trees, as if settled for the night. They were often to be seen, in the trees or on the wing, during the day, occasionally flying within a few feet of the numerous pedestrians like tame pigeons. That a bird so shy and wary as the ring dove should thus adopt as its haunt a large city, swarming with a bustling population, affords, I think, a strong proof of the readiness with which some of our wildest birds would live on social terms with us if we would afford them protection, or at least abstain from persecuting them. I have several times seen (or heard) wood pigeons in Kensington Gardens, but not, I think, in the winter, and they always kept well out of shot distance, never evincing the familiarity of the Paris birds.—*Henry Hussey ;* 7, *Hyde Park Square, February* 25, 1860.

Wild-fowl in the London Ornamental Waters.—Having for several years paid particular attention to the aquatic birds in the different London waters, I have often seen there wild-fowl (as they are commonly called), of some four or five species, with perfect wings. As no wild bird, with its powers of flight unimpaired, would be likely to stay for half an hour after it was turned out in any of these waters, I have always supposed that these birds must be London bred, that is, hatched in the Zoological Gardens (or perhaps in the Regent's or St. James's Park), and that they merely staid in town for the season until their migrating time came. Some of your correspondents can perhaps enlighten me on the subject. I have notes of the following birds with perfect wings, when and where seen :—

1851 : July. In the Serpentine. A male wigeon.
1852 : February. Round Pond, Kensington Gardens. A female wigeon.
1853 : December. Lake in the Regent's Park. A male wigeon.
1854 : March. Pond in the Botanical Gardens, Regent's Park. A pair of gadwalls (male and female) and a pair of shovellers (male and female).
„ February. Ditto. A male wigeon.
1856 : February. Regent's Park Lake. A male wigeon.
„ February, March and December. Botanical Gardens. A pair of hybrid wigeons (mallard and wigeon), male and female.
„ December. Regent's Park Lake. A female tufted duck.
1857 : February. Botanical Gardens. A male gadwall.
1858 : January. St. James's Park. A male gadwall.
1859 : January. Regent's Park. A female hybrid wigeon (mallard and wigeon).
„ April. St. James's Park Canal. A male gadwall and a whitefronted goose.
„ December ; and February, 1860. Ditto. Two male gadwalls.
1860 : January. Ditto. A ferruginous (or whiteeyed) duck
1859 : December ; and January and February, 1860. Regent's Park Lake. Two male hybrid and one female hybrid wigeons.

From the above list it will be seen that a male wigeon, and in all probability the pair of hybrid wigeons, remained in town during the summer. Several years ago, when rude huts or platforms were erected in the Round Pond, Kensington Gardens, for the water-fowl, a male wigeon with perfect wings frequented the pond for two, if not more, years. One year he paired with a duck, somewhat darker in colour than a common wild duck; and I saw three of his progeny when about one-third grown. About the same time a pair of waterhens frequented the pond, breeding every year in one of the above-mentioned huts. The latter birds seem to me to be far less numerous in the London waters than they used to be. The boats have driven them entirely from the upper end of the Serpentine. I once counted seventeen waterhens feeding together near the inner circle in the Regent's Park. Previous to the introduction of the boats a small party of tufted ducks (nine birds, I believe) used to frequent the Serpentine, flying to and fro between that water and the canal in St. James's Park. I have frequently seen tufted ducks on the wing, long after migrating time, on both the above waters, but not of late years; and I never saw any young birds. It seems singular that a migratory bird, with full powers of flight, should remain during the summer in a place where it has no facilities for breeding. The conclusion I draw from the above and other facts is, that the wigeon and tufted duck might easily be semi-domesticated in places adapted to their habits; that they might be made quite as gentle as that familiar but most independent bird, the waterhen; and that the epithet "tame" is far more applicable to them than to the mute swan, which, as far as I can learn, will never stay at home unless he is crippled. Can any of your correspondents give a well-authenticated instance of young mute swans, with their powers of flight unimpaired, and at liberty, remaining in this country after the migrating period?—*Id.*

'*The Wild-fowler.*'—Mr. Folkard, in the above work, after describing the shoveller as a "diving" duck (p. 259), proceeds as follows:—"None of the species of shoveller can be recommended for culinary purposes." Now, as is well known to ornithologists, the shoveller is a surface-feeding, and not a diving or "oceanic" duck, and so far from being unfit for the table it is one of the best, if not the very best, of the edible ducks. Audubon, as quoted by Yarrell, rates it above the far-famed canvas duck. Colonel Hawker testifies to its excellence, and I think myself that it is superior to the pintail, excellent as that bird is. According to Yarrell there is but one species of shoveller known in England. Mr. Folkard's shoveller cannot therefore be the true bluewinged shoveller known to ornithologists, the Anas clypeata of Pennant and Montagu, and the A. rhynchaspis of Gould, but some other bird. Mr. Folkard does not mention the goldeneye or tufted duck, both well known on our coasts, and the latter one of the commonest of our wild-fowl. Can it be that on the Essex coast, where Mr. Folkard's shooting operations seem to have been chiefly carried on, these birds are called "shovellers"? A literary and "learned" sportsman ought not to be misled by provincial names, often absurdly incorrect. However the mistake arose, the author ought to correct it in his next edition, if he expects his book to supersede Colonel Hawker's. However much behind the modern march of intellect the Colonel may be in his shooting instructions, his ornithology may be depended upon.—*Id.*

Wild Swans on the Coast of China.—I had often heard talk of the swans seen and shot on the Foo-chow river Min, which some sportsman assured me were of two kinds, the white and the black. The black I of course attributed to a little imaginary colouring on the part of my informants, gray being implied, and the birds alluded to being in all probability the yearlings of the white kind. Some have also assured me

that swans are sometimes seen in the Chang-chow river here; but notwithstanding all my endeavours I have failed to get a glimpse of these rare monster game until this winter, when by some extraordinary luck, a few weeks ago, I received from a friend at Shanghai a pair of wild swans caught in that neighbourhood, which he informed me were large "wild white geese." Of course I could say nothing against the natural blunder of my friend when I had been so enriched by his exertions. The next thing was how to keep them alive for a few days, to watch their habits; but alas! Amoy is the last place to bring live swans to, unless one wishes to see them frolic among the shipping; so I was obliged to condemn them to my narrow court-yard, scarce more extensive than a London area; and in this prison I sedulously watched the dull habits of these once snow-white creatures, now reduced to as dingy a hue as any other gaol-bird. Their wings had been cleverly tied by passing a string round the first wing-bone and across the back, and thus kept the birds from using them too freely. Often as I have watched from a window above, I have seen them stalking awkwardly about the yard, the female always following the male. They would sometimes stand close together, and the female coaxingly rub her head and breast against the male, uttering all the while her plaintive notes, to which the male sometimes responded in a deeper key. These sounds were produced by the bird rounding her neck, lowering her head towards the breast and then raising it quickly again. The notes produced might be syllabled "co-co" uttered in a most melancholy tone, and were not unlike the wind escaping from some long brass instrument. The female was most constantly uttering the chaunt, consisting at times of two, at others of three or more notes, and continued it through the greater part of the moonlight nights. Often, while in my room in the upper story of the house, this plaint has recalled to my mind the notes of the distant hoopoe, or the less pleasant music made by some antiquated window swinging in the breeze on its rusty hinges. When suddenly approached the birds would both utter a loud "cow-cow," pronounced like the treble bark of some snappish cur, and, uplifting their necks, they would stand defiant, giving hoarse hisses; but if the hand were boldly put forward towards them they curved their heads and tried to escape. When taken up they would kick and throw the neck about violently, making a loud and shrill cackling noise, which might be heard at a great distance. It is evident from my observations above that mine possessed the same peculiar habits and cries as the wounded female of Cygnus ferus spoken of in Montagu's 'Ornithological Dictionary;' but my birds I have ascertained to belong to Cygnus minor, *Pallas* (C. Bewickii, *Yarrell*). Therefore, either the wild swan assimilates Bewick's swan in habits, or, what is more probable, Montagu was describing the female of C. Bewickii, which at that time was not distinguished from C. ferus. Dr. Schlegel, in the 'Fauna Japonica,' mentions a C. musicus *vel* ferus from Japan. Now, it would be worth while to ascertain if this statement is not a mistake, as I feel pretty confident that the wild swan on this coast belongs only to one species, the C. minor of Pallas. At all events the pair examined by me answer in every respect to the description given in Yarrell of C. Bewickii. After the death of the female the male was never heard to utter a sound of any kind; he held himself very erect and looked melancholy, continuing to refuse all food until nearly reduced to a skeleton; his legs yielded under him, and death put an end to his miseries.

CYGNUS MINOR, ♂.

Length 3 feet 9 inches. Wing from curvature 1 foot 7 inches. Bill from base of culmen to the tip 3 inches 4-tenths, frontal protuberance ½ inch; lower man-

dible 3 inches 4-tenths; bare extent of skin from top of eye to end towards nostril 2 inches 3-tenths, fine bright yellow, deeper than lemon; this colour also stains the naked skin that encircles the eye. Bill black, as also are the legs. Naked portion of tibia 1 inch 1-tenth; tarsus 4 inches; mid-toe 5 inches 2-tenths, its claw 7-tenths. Plumage white, with orange-brown speckles on the head and neck.

This bird was in every way superior in size to the female, and its sternum was vastly more developed. The trachea runs the whole prescribed length, nearly 6 inches, between the bone-plates of the sternum, and makes the horizontal loop described by Yarrell. The cœca were given off at about 6½ inches from the anus, and measured, the right one 11 inches, the left 12 inches: they were enlarged into leech-like ends.

Cygnus minor, ♀.

Length 3 feet 3½ inches. Wing 1 foot 7 inches. Bill along the culmen 3¼ inches, from the angle of the eye 4½ inches, depth 1 inch 8-tenths, black; skin at the base over the ridge, round the eye, but not reaching the nostril by ¼th of an inch, fine deep lemon-yellow. Inside of mouth purplish. Legs black; tarsus 3 inches 5-tenths; mid-toe 4 inches 3-tenths, its claw 7-tenths.

The trachea, instead of as in the male, enters the crest of the sternum, and progresses only a distance of 2 inches 2-tenths, leaving a cavity of 2½ inches, with a small up-turned plate inside at the end of the keel. The loop therefore is vertical, the trachea so soon bending on itself and making its exit to enter the thorax. Now, Yarrell and Macgillivray both distinctly state that the female, in points of anatomy, is similar to the male. We must therefore conclude that the lady was the second or third wife of the gentleman; but there is nothing in their external appearance to warrant this belief, excepting size, for both are equally white, and the superior osseous development of the male's body, which appears on dissection, might easily be attributable to sexual difference.

It will be seen, however, that C. Bewickii, instead of being limited to Iceland and other places on the western side of the old hemisphere, is equally found on the eastern side. It is known in Chinese works as the Hai (sea) Yen, but is a stranger to the natives of this part.—*Robert Swinhoe; Amoy, December* 23, 1859.

Notes on the Mountain Birds of Jamaica.

By W. Osburn, Esq.*

"Agualta Vale, Metcalfe, Jamaica,
January 20, 1860.

"My dear Sir,—By far the most considerable of the 'rivers' I alluded to in my last as forming so remarkable a feature in the scenery of Metcalfe is the one which reaches the sea through this beautiful little valley. A good many Spanish names still adhere to their old localities hereabouts, but I never heard the name 'Agua Alta' applied to it, except in maps; and it does not seem very clear why the old colonists should have chosen it for a stream two or three feet deep,

* Communicated by P. H. Gosse, Esq., F.R.S.

unless it allude to its floods, when it would be very appropriate indeed. But the English name, the 'Wag Water,' expresses* exactly its winding tortuous course at all times, as it threads its way through many a gloomy gorge for some thirty miles from the mountains of St. Andrew's. At its entrance into the valley here, it is really nothing more than a lively bright little mountain stream. The lofty hill of shale, which here forms the western bank, is topped by an overhanging brow of red conglomerate, rendering the dense forest beneath it still more gloomy. The trees grow on the steep slope, amid huge angular fragments of the same rock, some of which have rolled into the river below. Beneath these the Wag Water delights to scoop out its shingle into deep holes, in whose blue-green depths the mountain mullets love to lurk. This hill is succeeded by another, rounder and of shale alone, towards the base of which the overseer's house is built. It forms, in some sort, the head of the valley, for the rounded shale hills which continue to follow widen the valley by receding westwards as they diminish in height till they sink into the belt of swamp I have before alluded to.

"The eastern limit is formed by the spurs of a shale peak of considerable elevation. Towards the river they terminate suddenly in precipices, whose bare brown heights tower amid the trees and jungle that cling about them. Their surface must constantly be renewed by the crumbling of the shale, as not one of the numerous plants which so readily drape and festoon such situations in the tropics seems able to hold the ground. The river-shingle extends to their base, and the floods doubtless greatly aid the process. These spurs, as they succeed each other obliquely to the river-course, fall back to the eastwards, till one advancing further than the rest shuts in the view in this direction. Thus from the overseer's house opens a valley about two miles in length and half a mile across. The rounded shale hills are covered by the coarse guinea-grass I have mentioned, now dry and brown, dotted with the sombre rigid tufts which the great macaw palm (*Cocos fusiformis*) rears on its armed stem; or the hollows are choked with the numerous hardy shrubs which take immediate advantage of slackened cultivation to gain possession of the soil. Among these the logwood (*Hæmatoxylon*) and an Acacia or two hold a conspicuous place. Guinea-grass and bush are more mingled on the steeper hills to the east, but they have long been cleared of the ancient forest; and uninterrupted lines of bamboo from base to summit are the durable

* I believe, however, that "Wag-water" is but an English corruption of Agu' alta; just as Bocâgua, on the Rio Cobre, has been corrupted to "Bog-walk."—P. H. G.

remains of a culture now long neglected. The valley is terminated by a line of dark green, the rank vegetation of the swamp. Over this tower the cocoa-nuts, growing on the banks of sea-shingle I have described; above these a blue segment of the Caribbean, across which rise the masts of a vessel at anchor in Annotto Bay; as she swings to the wind these last appear as one, so that the valley must be nearly N.E. and S.W., and down it rushes the fierce sea-breeze the whole day long. But the bright little river is the chief object; for, what is remarkable in a Jamaica stream, no trees fringe its course, and it is thus visible sparkling over its shallows, or its blue surface ruffled by the sea-breeze, save where its own perpetual windings hide it behind its banks.

"The valley seems once to have consisted wholly of an alluvium (the morass may have extended up it), a rich valuable soil, and the portion now remaining is covered with waving squares of sugar-cane or rich pastures, sparsely dotted with trees, chiefly the fiddlewood (*Citharoxylon*) and a beautiful tree called by the negroes 'yoke-wood;' here it abounds, but I have met with it elsewhere, but where it seemed planted; it is now covered with a profusion of flowers, larger than, but of the colour of, apple-blossoms, succeeded by narrow pods two feet long: it is a Bignonia, and, as I believe B. leucoxylon; I have heard it called also 'Spanish elm,' and it is very like an elm in shape when its growth is undisturbed, but in nothing else, for its foliage is a soft gray-green. This alluvium now occupies only about one-third of the valley—the rest is the Wag Water's own. Close to the base of the shale precipices of the eastern bank is a narrow line of swamp, showing plainly the river once flowed there. Between this and the river lies a tract of shingle. Lower down still the road crosses a crescent-shaped pond, now grown up, all but the fording, with reeds, and much frequented of Rallidæ. This was the river-bed only three years ago; now by a sudden bend it is working away at the bases of the western hills, half a mile off, with what success the prostrate trunk of a huge cotton tree tells plainly. The many acres of land included between these shifting courses is deeply covered with shingle; the floods bring down the former soil, being completely washed away, to the great detriment of those interested in its cultivation. Where this shingle has been long undisturbed a herbage gradually covers the hungry soil, but not very profitable, it would seem, as pasturage. The limit of the floods is marked by a scanty vegetation of a very peculiar nature, whilst the recently-formed shoals lie bare and gray, a broad margin on which nothing will grow.

"It is to these two last, forming a tract of varying breadth, but often

of considerable extent, and to the birds which frequent it, I would devote the present letter. The plants which sparsely occupy such a soil must often 'spring to perish there,' but at the best they must be able to get a firm hold of the loose shingle, to bear submersion beneath the turbid and rapid waters for some time, and then half-buried in loose stones and loaded with drift, and still able to recover themselves. One of the most abundant of these is Cleome heptaphylla, whose irregular white flowers seem always in bloom. Little tufts of the common Mimosa pudica and Æschynomene americana, both in differing degrees sensitive, are numerous. Amaranthus viridis, common everywhere, here holds its ground in green patches, without beauty of any sort; but the Amaranths have a gay representative in a species whose bright purple calyces and bracts collect into a spike—brilliant bits of colour against the cold gray of the stones amid which they grow. The horses' hoofs, in crossing little clumps of herbage, produce a rattle singularly metallic, considering its source—the dry seeds of various species of Crotalaria loose within the dried and inflated pods. C. retusa is a common weed, though its spikes of large yellow papilionaceous flowers make it very ornamental. With C. verrucosa, here equally common, the flowers, scarcely less, are a purplish blue. C. striata rises to a bush three or four feet in height, but the flowers are insignificant; and this list might be extended with many others. As seems very commonly the case with plants in barren, exposed situations, though sometimes stunted in growth, the seed is produced with unusual profuseness; hence, at this season, the shingle is frequented by numerous flocks of Spermophila olivacea and bicolor. I may remark that if these little birds ever really cease building nests and rearing young at all it is during the first two months of the year. The flocks at this time are more numerous, and numbers of the adult males, with distinguishing orange or black, appear among them; but the autumnal flocks do not seem to exceed five or six, and then, as I have often noticed, there is no adult male with them, which would look as if they were broods of young. They certainly breed, however, as late as the end of October and beginning of November. In quest of the same abundantly-supplied food are numbers of your Coturniculus tixicrus, a very universally distributed little bird, as the last. I found it abundantly in the pastures round Freeman's Hall, than which a locality more diverse from this can scarcely be. This pretty sparrow rises, takes a short flight, and drops suddenly a few yards off, or will sit watching on a low twig without any fear.

"At this season, in numbers not much less, is the pretty Sylvicola,

the males of which have now the indications of the deep chesnut crown which becomes fully developed in spring, and which seems evidently the one you have identified as Sylvicola æstiva. I saw them very rarely on the tertiary limestone, but in Vere, where there are many barren dry tracts similar to this, they were common. I left it in Vere in April, and found it here again in October. It is a very lowly species in habit, hopping constantly on the shingle itself.

"It is chiefly, however, when the gusty winds called 'norths,' on the south-side cold and dry, but which here bring up heavy rains often of several days' continuance, speedily convert these streams into powerful torrents, turbid with washings from the shale and laden with the pebbles of the conglomerate, that the birds which then suddenly make their appearance become particularly interesting. The river subsides, from the great breadth of soil it has covered as it approaches the coast, almost as quickly as it rose. Little pools are left in the shingles, and in these are imprisoned one or two species of Crustacea which crawl and hide amid the pebbles of black trap, porphyry, dark blue limestone, green serpentine, red syenite and granites of different grays, of which it is composed. Shoals of little fish glance and glide or dash round their narrow bounds, rippling the surface in their alarm. Though supplied by rains and dews these speedily dry up, but the retreating river still leaves more, and thus very considerable numbers of these little creatures are exposed to a lingering death, unless means were provided for their more speedy and less painful destruction. These pools, only six inches or less in depth, do not seem suited to the kingfisher (*Ceryle Alcyon*) which abounds on the Wag Water. I never saw them fishing but in much deeper water, which the force of the plunge evidently requires, that the bird should not injure itself. The Scolopacidæ and Charadriadæ appear only to run through them and search for prey much more minute. But to the beautiful group of Ardeadæ, which then appear in numbers, they seem exactly suited; as soon as the 'norths' set in they come. As the rivers rise and then recede, they may be seen in numbers scattered along the banks. If, as this year, the rains speedily cease, not one will be found where a dozen might have been counted before; they disappear entirely. The largest of the group is the great heron (*Ardea Herodias*), which, however, though it increases in numbers during the rains, seems a permanent resident, at any rate during the months I have been here.

"I had before only seen it flying out at sea at some distance, or over some impenetrable morass of great extent. But here they

are by no means so uncommon, though still extremely wary. In open situations, as these beds of river shingle, their great height gives them so commanding a view, it is impossible to approach unperceived. They rise with slow beats of the immense wings, alight a hundred yards off, and then, erect and exactly fronting the intruder, watch his movements. If disturbed a second time they rarely alight again within sight. After some time a negro succeeded in shooting one for me. The chief dimensions were as follow :—Length 47 in.; expanse 73½ in.; height, when placed in a standing position as natural as possible, 49 in.: the stomach contained only a little muddy matter, gritty to the touch, and several sets of the wings of our largest Libelluladæ, showing they do not despise insect-prey: the mandibles still grasped an eel about eighteen inches long, the head (much bruised and the bones broken) foremost down the throat. For some time past one has frequented this valley, but has always eluded my most carefully planned attempts to get a shot. It seems always on the watch, and, after one delay, rarely fails to take a wide sweep, and slowly floats to the topmost boughs of a lofty tree at the base of one of the shale precipices, and there waits till danger disappears. About a fortnight ago it was joined by another. They keep close together, and seem, as they come slowly flapping low over the river, to take up its whole breadth. I may remark they always curve back the neck when flying, and never proceed to considerable distances with the neck outstretched and legs hanging, as the egrets will often do. They are exceedingly regular in their habits of visiting particular spots at certain hours of the day, and this for many days together. I have latterly, from indisposition, been unable to carry my gun or go out, except in the cool of the day, for the delicious half-hours which precede and follow the sunsets of the tropics. In riding along the road towards the narrow gorge, through which the river breaks into the valley, I regularly saw these birds in the middle of the stream where the water rippled over a shoal. No artifice I could adopt enabled me to approach them. If I went on along the road they watched me, as I observed they did many groups of negroes, but remained; but if I stopped they were off. At last one evening I did not see them: I approached the river to search, my position being on the high bank of ancient alluvium; the opposite bank of river-shingle low and shelving. Suddenly one came round a bend of the river and alighted a yard or two from the water on the opposite bank: I happened to be there first; its distance from me might be about fifty yards. The bird immediately drew itself up in

the attitude of suspicion, so extremely erect, I think my estimate of height is a few inches too little. It stood perfectly motionless and exactly opposite. This position is doubtless assumed that both eyes may be brought to bear, but it seemed to me singularly to disguise the bird, the loose tuft of feathers on the breast hiding the compressed body from view. The mingled white and reddish brown of the extended neck, the height, the stillness so unlike a bird, conjoined,—it might easily at that distance have been taken for some other object, a dry bamboo, for instance, stuck in the shingle. I allowed my horse to graze, and its suspicions seemed allayed, for it walked deliberately into the water, and then without stopping into the middle of the stream. It was now only about forty yards off. It took a position a little below a shoal and facing the stream (a constant habit on the two or three occasions I have been able to observe), tucked up its large wings and began to fish. Its body was not so erect as when watching on shore, but the neck was kept upright and stiff, only the lower cervical vertebræ apparently moving on each other, as like a long arm it was slowly moved from one side to the other, as any object in the water attracted the bird's attention. This motion was very singular and uncouth, but perhaps we may trace in it the mode in which every advantage is retained of the commanding height, evidently made so important a point in the structure of the bird so as to gain the most extended view possible of the water beneath, whilst the slow movement would prevent alarm in adjacent prey. It was standing in about six inches of water. It suddenly stopped, regarded intently a point two or three feet in front, advanced two or three steps, crouched so that the breast touched the water, the neck forming a sigmoid curve, and then made two or three rapid snaps in the rippling water, and I could see something swallowed — small fishes probably. It then resumed the same manœuvres, and in a few minutes a much larger object was taken, which I immediately recognised to be an eel about eighteen inches long. With this it flew with a stroke or two of the huge wings to the shingle-bank, and there proceeded to despatch its prey, holding the head and jerking it violently with the action common to birds. The body was held low and stooping, the neck bent in graceful curves. The last rays of the sun glowed on its sombre but not inelegant plumage, and glistened on the shining coat of its struggling prey; the whole, on the patch of bare shingle with its scanty weeds, forming one of those wild scenes of Nature which have a charm about them impossible to describe.

"The great white heron (*Egretta leuce ?*) is not much less in size, but so far as my observations hereabouts have extended, is only a transient visitor during the heavy rains. Towards the latter end of October and beginning of November their stately forms might be seen here and there at the margin of the little rivers, where they cross the belt of swamp all along the coast. In this valley I never saw more than two. The one I shot, a female, proved smaller in dimensions than the male procured last spring in Vere. Instead, however, of keeping to the river as the great heron (*Ardea Herodias*), they were particularly fond of walking gracefully round the edge of the little glassy pools among the pebbles, or standing motionless over their own fair shadows watching the movements of the shoals of little fish. They crouch as the preceding species, so that the breast touches the water, and then, darting the head in different directions, snap up their prey with great rapidity. It was whilst doing this I succeeded in approaching near enough to shoot this wary bird. Their habits, in other respects, greatly resemble those I have detailed of the larger bird. They rise at a great distance, stop to watch at about one hundred yards, and then, if disturbed, the almost constant habit of the bird I saw most of was to circle slowly till it reached a withered bough of a tall solitary tree, in one of the pastures, and there, as conspicuous an object as dazzling white plumage in the blaze of a tropical mid-day could make it, maintain a vigilant look out. Towards evening he might again be seen floating over the windings of the river in search of a fishing-ground. The season since this period has been unusually dry and fine, and I have seen nothing more of them. Notwithstanding their size, they do not seem to reject very small insect-prey, as I found the stomach to contain the elytræ of water-beetles as well as small Crustacea and a small species of Gobius.

"The next in size is a much less bird, but snow-white also. The bill is black all but the base, which, like the skin of the face, is bright yellow. The tarsi are black in front, behind of the same colour as the toes, a greenish yellow. This I presume to be the species you have identified as Egretta candidissima. The occipital, scapular and dorsal plumes are more filamentous than with the other two white species, and give a lace-like appearance to the snowy plumage extremely beautiful. It is the only one of our Ardeadæ (except perhaps occasionally E. cærulea) which can be said to be sociable, and it is so to a great degree. I never fell in with it at all in the South-West; but about Milk River and the Great Morass called

Portland Salina, in Vere, they were numerous, and I saw them not unfrequently floating in lines of ten or twelve against the bright morning sky. In October I fell in with a flock of six, reposing on the mangroves of the great lagoon near Dry Harbour, and all along the coast of St. Ann's and St. Mary's they were to be met with wherever the locality was suitable. Here they appeared in the same flocks and carried their associating tendencies so far as to admit other species into their company. I first observed this in a little flock, with a blue egret (*E. cærulea*) among them, which I pursued some time in a boat on the lagoon behind Annotto Bay; the darker bird flew and alighted with them exactly as one of the rest. And here on the Wag Water I frequently saw them in close company with E. leuce, a giant in comparison, and thus four or five of these beautiful birds of two species stepped stately in various graceful attitudes round the same bright bit of water. The stomach of one I dissected contained the little freshwater prawns; the posterior portion of the œsophagus acts as a crop, and was distended with a mass of about seventy or eighty of them. Their visit here is also transient just during the rains.

"The third white species is your E. nivea, easily distinguished from the last two by the ashy tips to the wings, the colour of the bill and feet; and it is scarcely less so by its habits. I never saw it but quite solitary, though several might be fishing within short distances of each other. It is much more numerous and far more fearless than the other species, and is thus easily approached and shot. During the rainy season it is by far the most widely-distributed: scarcely a cattle-pond is without its occasional visitant. I found this solitary bird on the stream which flows through the small amount of cleared land round Freeman's Hall, the more remarkable as the extensive forest all round offers no other suitable localities; except a bird now and then to be seen near the morass, it has disappeared as the rest.

"Blue Egret (*Egretta cærulea*). Though the deep lavender-blue and empurpled neck render its plumage a contrast to the last three species, it is not less beautiful. It was tolerably common during the rains, and I have seen a solitary bird once or twice about the lagoons. But in Vere I found it not uncommon during the driest weather. Along the Milk River, as late as April, it still associated in little companies of three or four, which would rise with legs hanging and necks stretched to alight a few hundred yards further on, as the approach of the canoe disturbed them. I found the stomach of a bird shot

immediately after, a specimen of Egretta candidissima, to contain precisely the same food, freshwater prawns.

"Of that very common species, Herodias virescens, I have very little to add to your remarks, except that it perhaps is here unusually abundant, even little splashes in the pastures being tenanted. The tarsi are in proportion much shorter than with any of the above species, and it always prefers a sedgy, or at any rate grassy, margin. I have never observed it or Egretta cærulea or the great heron (*Ardea Herodias*) fishing in the open pools of the river-shingle. May we not ask whether the total absence of colour in the snow-white egrets may not better fit them to watch for prey with success in such clear transparent shallows than the darker plumage of the other species? And there seems another reason why we may conclude it is of some very absolute service to the bird, as it seems very greatly to increase its danger during its motionless occupation. I have often been surprised at how great a distance they were visible at their posts down the river-margins, a distance at which it would have been extremely difficult to detect the far larger Ardea Herodias. Ardeola exilis is extremely common, but about the jungle of the swamps only; I have never seen it on the Wag Water.

"W. Osburn.

"To P. H. Gosse, Esq."

A Sea Serpent in the Bermudas.—I beg to send you the following account of a strange sea-monster captured on these shores, the animal being, in fact, no less than the great sea serpent which was described as having been seen by Captain M'Quhae, of H.M.S. 'Dædalus,' a few years since. Two gentlemen named Trimingham were walking along the shore of Hungary Bay, in Hamilton Island, on Sunday last, about eleven o'clock, when they were attracted by a loud rushing noise in the water, and, on reaching the spot, they found a huge sea-monster, which had thrown itself on the low rocks, and was dying from exhaustion in its efforts to regain the water. They attacked it with large forks which were lying near at hand for gathering in sea-weed, and unfortunately mauled it much, but secured it. This reptile was sixteen feet seven inches in length, tapering from head to tail like a snake, the body being a flattish oval shape, the greatest depth at about a third of its length from the head being eleven inches. The colour was bright and silvery; the skin destitute of scales, but rough and warty; the head in shape is not unlike that of a bulldog, but it is destitute of teeth; the eyes were large, flat, and extremely brilliant; it had small pectoral fins and minute ventral fins, and large gills. There were a series of fins running along the back, composed of short, slender rays, united by a transparent membrane, at the interval of something less than an inch from each other. The creature had no bone, but a cartilage running through the body. Across the body at certain intervals were bands,

where the skin was of a more flexible nature, evidently intended for the creature's locomotion, screw-like, through the water. But its most remarkable feature was a series of eight long thin spines of a bright red colour springing from the top of the head and following each other at an interval of about one inch; the longest was in the centre: it is now in the possession of Colonel Munro, the acting governor of the the colony; and I had the opportunity of examining it very closely. It is two feet seven inches long, about three-eighths of an inch in circumference at the base, and gradually tapering, but flattened at the extreme end, like the blade of an oar. The shell of these spines is hard, and, on examination by a powerful glass, appeared to be double, some red colouring matter being between the shells; the outside, which to the touch and natural eye was smooth, being rough and much similar to the small claws or feelers of the lobster or crayfish. The centre was a white pith, like an ordinary quill. The three foremost of these spines were connected for about half their length by a greasy filament; the rest being unconnected, the serpent had the power of elevating or depressing this crest at pleasure. The serpent was carefully examined by several medical and scientific gentlemen; the head, dorsal spine, and greater part of the crest are in the possession of J. M. Jones, Esq., an eminent naturalist, who will, doubtless, send home a more learned description of this "wonder of the deep." I regret that the immediate departure of the mail for England prevents my preparing you any more careful drawing of this "great sea serpent" than that I enclose.

[Written by Captain Hawtaigne, of Her Majesty's 39th Foot. I place implicit reliance on the narrative, except as to the animal being identical with that seen by Captain M'Quhae, of which I think there is no evidence. Mr. J. M. Jones is an old subscriber to the 'Zoologist,' and a most intelligent naturalist; but the query occurs to me, "Is not *this* sea serpent a ribband fish?"—*E. N.*]

Proceedings of Societies.

Entomological Society.

Anniversary Meeting, January 23, 1860.—H. T. Stainton, Esq., F.L.S., Vice-President, in the chair.

The Chairman read a letter from the President of the Society, Dr. Gray, stating his absence was caused by indisposition.

Messrs. J. W. Douglas, W. W. Saunders, F. Walker and J. O. Westwood were elected Members of the Council, in the room of Messrs. J. S. Baly, F. P. Pascoe, F. Smith and G. R. Waterhouse.

J. W. Douglas, Esq., was elected President; S. Stevens, Esq., Treasurer; and Messrs. Edwin Shepherd and Edward W. Janson, Secretaries.

The Chairman delivered an address on the present state and future prospects of the Society and Entomology, for which the Meeting passed a cordial vote of thanks.

Mr. Saunders, one of the Auditors of the Treasurer's accounts, read an abstract thereof, and congratulated the Meeting on the favourable state of the Society's finances.

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

A vote of thanks was passed to Dr. J. E. Gray, the retiring President, for his services to the Society during his period of office.

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

February 6, 1860.—J. W. Douglas, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'The Zoologist' for February; presented by the Editor. 'Notes on the Silkworms of India,' by Capt. Thomas Hutton; by the Author. 'Synopsis of the known Asiatic Species of Silk-producing Moths, with Descriptions of some New Species from India,' by Frederic Moore, Assist. Museum India House; by the Author. 'Stettiner Entomologische Zeitung,' 1859, Nos. 10—12; by the Entomological Society of Stettin. 'The Journal of the Society of Arts' for January; by the Society. 'The Literary Gazette' for January; by the Editor. 'Farm Insects,' Part 8; by the Author, John Curtis, Esq., F.L.S. 'Nouveau Guide de l'Amateur d'Insectes, par plusieurs Membres de la Société Entomologique de France'; by H. T. Stainton, Esq. 'An Address delivered at the Anniversary Meeting of the Entomological Society of London, on Monday, January 23, 1860'; by H. T. Stainton, Esq. 'Notice of the Presentation of the Hope Collections to the University of Oxford'; by J. O. Westwood, Esq., M.A., &c.

Election of a Subscriber.

Arthur E. Crafter, Esq., of Tokenhouse Yard, was balloted for and elected a Subscriber to the Society.

Exhibitions.

Mr. W. W. Saunders exhibited two fine Orthoptera, a Phasma from New South Wales, and a Gryllus from Peru, both insects being entirely covered with diverging spines.

Mr. Stevens exhibited specimens of a species of Coccyx allied to C. strobilana, *Linn.*, but much larger; he had recently bred them from cones of Conus Benthammiana, received from California.

Mr. Waterhouse exhibited specimens of a species of Bembidium, which he stated he had had in his collection for many years separated as a distinct species, but hitherto had been unable to identify with any description. The insect in question greatly resembles the Leja lampros of our collections, but differs in being shorter and broader, and in having the antennæ entirely black; the legs, moreover, are entirely black, or with a mere indistinct trace of rufo-piceous in the tibiæ; the head is broader than that of L. lampros, the frontal ridge relatively much broader, and the lateral sulci less strong; the thorax is broader and relatively shorter, less contracted behind, the sides more strongly rounded, and here the rounded outline is continued almost to the posterior angle. In B. lampros the side is distinctly sinuated at a greater distance above the angle, and the angle thus becomes prominent and somewhat acute, whereas in the insect exhibited the angle is a right angle; the transverse depression on the back of the thorax is less strongly marked, and the lateral foveæ are smaller; the elytra are shorter, more ovate, and more convex; the striæ scarcely differ, excepting that the punctures are a little less strong.

Mr. Waterhouse has no note of the locality of the original specimens of his collection: he had recently seen the insect in a box of Coleoptera sent by Mr. J. C. Dale to be named, and he had procured two other specimens from a collection which formerly belonged to Mr. Walker, of Mansfield.

Upon a former occasion, in attempting to identify this insect with descriptions, he had considered the account given by Gyllenhal of the colour of the legs in his B. nigricornis was such as to preclude the identification of the present insect with Gyllenhal's; but considering that in other respects the description in the 'Insecta Suecica' agrees with the insect exhibited, he was now inclined to apply the name "nigricornis" to the species, and to suppose that the discrepancy was more apparent than real as regards the colour of the legs.

Mr. Janson exhibited five species of Coleoptera not hitherto recorded as inhabitants of Britain, and made the following remarks concerning them:—

Quedius truncicola, Fairmaire, Faune Ent. Franç. i. 538, 14 (1856). Nearly allied to Q. fulgidus, F., and bearing a very close resemblance to Erichson's var. 3 ("niger, pedibus piceis, abdomine rufo-brunneo basi nigricante"), but from which it may be distinguished by its punctured scutellum. I captured the two specimens exhibited, the only individuals I have yet seen, under bark of elm; one near Tottenham, on the 29th October, 1848, the other near Hampstead about a fortnight since. In the first of these the punctures on the scutellum are so few and ill defined as to be scarcely perceptible.

Haploglossa rufipennis, Kraatz, Naturgesch. d. Ins. Deutschl. ii. 81, 3 (1856). Distinguished from its near ally, H. pulla, Gyll. Eric. Kraatz, by its more parallel form, closer and much finer punctuation, and the colour of the elytra, which are red, with a dark patch in the region of the scutellum, and at the outer posterior angles. Found by Mr. Wollaston in sand-pits on Reigate Common, on the 26th June, 1857, and by myself in brushing in the same place on the 6th July, 1859.

Cryphalus Fagi, Fab. A single individual taken by myself, at Hampstead, on the 31st July, 1859, amongst the refuse of a stack of faggots. The narrow subcylindrical form, long elytra, prominent tubercles or processes on the anterior portion of the thorax, and red legs and antennæ, distinguish this species. Mr. Gorham informs me that he has recently found some numbers of a Cryphalus in bark of beech, at Westerham, Kent, and which will probably prove to be specifically identical with the example now before the meeting.

Cryphalus Abietis, Ratzeb. Two specimens given me by the Rev. A. H. Matthews, by whom they were taken from bark of firs, in the vicinity of his residence at Gumley, Leicestershire. Distinguished by the tubercles on the anterior portion of the thorax being few in number and irregular in their distribution (not in concentric rows), the regular striæ of punctures and the short pubescence of the elytra. The legs and antennæ are red; the club of the latter pitchy black.

Anthicus bimaculatus, Illiger, Schmidt, de Laferté, *var. β*. A single example, given me by Mr. Joseph Chappell, of Pendleton, near Manchester, by whom it was sent up to me, together with a number of other Coleoptera for determination, and who informs me that it was taken during the past summer on the Lancashire coast. Readily distinguished from all the species of the genus yet ascertained as indigenous to Britain, by its large size, pallid hue and obovate convex elytra. The normal form, that first described by Illiger, has a triangular black dorsal spot on each elytron a little behind the middle, but of this in the specimen exhibited there exists scarcely any

indication. M. de Laferté, Monogr. des Anthicites, 149 (1848), remarks "that the individuals from the shores of the ocean are generally paler than those from the eastern countries of Europe, and that those from the coasts of France and Belgium are entirely destitute of the discoidal spot."

Mr. Janson also exhibited the following rare species:—

Philonthus fuscus, Grav. Taken by himself in a boletus on an ash, near Hornsey, Middlesex, on the 19th ultimo.

Oxylaemus cylindricus, Panz., Eric.. Found by Turner about ten days since, in bark of oak in the New Forest, near Brockenhurst.

Tomicus monographus, F. The male, apparently very rare, conspicuous by having the anterior margin of the thorax triangularly produced with the apex recurved; found by Turner at the same time and under the same circumstances as the foregoing. Erichson (Naturgesch. d. Ins. Deutschl. iii. 284, 1845), adds to his description of Oxylaemus cylindricus: "In oaks, rare. Found by Professor Ratzeburg and myself in the burrows of Bostrichus monographus." It is therefore interesting to find the two species associated in this country.

Platydema violaceum, F. Likewise taken by Turner, under bark of oaks, at the same time and in the same locality as the two preceding.

The President remarked that he had himself taken Philonthus fuscus, under bark of trees infested by the larvæ of Cossus ligniperda, and Mr. Shepherd stated that he also had met with this species in similar situations.

Mr. Sealy exhibited a beautiful series of varieties of Colias Edusa, including the white female variety (Helice, *Hub.*), and examples forming links from it to the typical insect: also a specimen of Sphinx Pinastri, said to have been captured by a young entomologist whilst flying about a fir-tree at Romsey, Hants.

The President remarked that, with the exception of the specimens said to have been received by the late Dr. Leach many years ago from the neighbourhood of Edinburgh, there was no record of the capture of this species in Britain, although so abundant in many parts of Europe; he inquired of Mr. Sealy whether there was any likelihood of the specimen exhibited being a foreign example which had been inadvertently placed amongst insects from the locality mentioned.

Mr. Sealy replied that the reputed captor had some time previously visited Switzerland, and there taken a few insects, but he was assured that the S. Pinastri was not one of the Swiss captures; moreover, he (Mr. Sealy) believed that country was not a locality for S. Pinastri.

Mr. Stainton observed that Mr. Sealy was mistaken, as the insect is well known in Switzerland; it was, however, only fair to state that from his knowledge of the habits of S. Pinastri on the Continent, he considered the neighbourhood of Romsey a very likely spot for the occurrence of this species.

Mr. Stevens exhibited specimens of four species of Lomaptera sent from Batchian by Mr. A. R. Wallace; he also communicated the following by Mr. A. R. Wallace:—

Note on the Sexual Differences in the Genus Lomaptera.

"Lacordaire says in his 'Genera' that the Lomapteræ offer no sexual distinctions, except slight variations in the legs; and in the generic character he adds 'the fore legs are three-toothed in both sexes or in the females only.' In four species of the genus which I have recently taken in the Gilolo group of islands, I have, however, observed very strongly marked sexual differences, and I have had the good fortune to

confirm them by capturing pairs of two species *in copulâ*. These differences are as follows :—

"1st. The males have always a distinct longitudinal furrow or depression on the under side of the abdomen, which in the females is quite smooth or rounded.

"2nd. The males have one tooth less than the females on the outside of the anterior tibiæ. In the two larger species the males have two and the females three teeth ; in the two smaller species the males have but one (terminal) tooth, the females two teeth.

"3rd. The pygidium in the males is simple, with the extremity somewhat obtuse. In the females it terminates in a sharp reflexed edge, and in the two smaller species is swollen and compressed above and very concave beneath, while in the males it is a simple ovate cone equally rounded above and below.

"It is probable that these characters exist in all the species of the genus, and may enable persons possessing series of Lomapteræ to pair their specimens. I may here remark that the species of this genus are very closely allied, and at the same time very limited in their range. In Ternate and Gilolo, and in Kaiòa and Batchian,—islands only ten or fifteen miles apart,—are found distinct but closely allied species, differing so slightly (although constantly) that they would be infallibly considered as very trifling varieties, if single specimens of each only were examined. Differences of colour exist in specimens from the same locality ; while minute differences of form and sculpture mark these representative species of adjoining islands."

Mr. Gloyne read descriptions of some new species of Lema.

Mr. Stainton read 'Descriptions of South-African Tineina collected by R. Trimen, Esq., in 1858—59.'

Mr. Tegetmeier announced the death, on the 31st ult., of Dr. Edward Bevan, of Hereford, one of the original Members of this Society, and author of that well-known work, 'The Honey Bee,' at the advanced age of 80 years.

March 5, 1860.—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. xx. Part 2 ; presented by the Society. 'Journal of the Asiatic Society of Bengal,' No. 99 ; by the Society. 'Journal of the Proceedings of the Linnean Society,' Vol. iv. No. 16 ; by the Society. 'The Zoologist,' for March ; by the Editor. 'Saggio di Ditterlogia Messicana, di Luigi Bellardi, Professore di Storia Naturale,' Part 1 ; by the Author. 'Mémoires de la Société de Physique et d'Histoire Naturelle de Genève,' Tome xv. 1re Partie ; by the Society. 'The Journal of the Society of Arts' for February ; by the Society. 'The Literary Gazette' for February ; by the Editor. 'The Athenæum' for February ; by the Editor. 'The Entomologists' Weekly Intelligencer,' Nos. 171—179, inclusive ; by the Editor, H. T. Stainton, Esq. 'Stettiner Entomologische Zeitung,' 1860, Nos. 1—3 ; by the Entomological Society of Stettin.

Election of Members.

Dr. Schaum and Mons. Leon Dufour were elected Honorary Members, and Mons. J. Bigot, Vice-President of the Entomological Society of France, of Rue de Luxembourg, Paris, an ordinary Member of the Society.

Exhibitions.

Mr. Stevens exhibited a large box of Coleoptera sent from Batchian by Mr. A. R. Wallace; it contained a vast number of new species, some beautiful Buprestidæ, &c.

Mr. Janson exhibited a box of Coleoptera he had just received from Mr. C. Turner, collected by him during the last few weeks at Rannoch, Perthshire, and remarked that no less than four of the species were not comprised in Mr. Murray's 'Catalogue of the Coleoptera of Scotland,' viz., Xyloterus domesticus, *Linn.*, Tomicus acuminatus, *Gyll.*, Cis Alni, *Gyll.*, and Bradycellus placidus, *Gyll.*

Mr. Dunning exhibited a singular pale Noctua, which had been pronounced by Mr. H. Doubleday to be a variety of Mamestra anceps.

Mr. Dunning also read a letter addressed to him by C. Maurice, Esq., respecting the specimen of Sphinx Pinastri exhibited by Mr. Sealy at the last Meeting of the Society, in which the writer asserted positively that the insect in question was caught by him at Romsey, as then stated by Mr. Sealy.

The Secretary also read a letter addressed to Mr. Sealy by S. H. Maurice, Esq., brother of the before-named gentleman, who had, as mentioned at the February Meeting, taken some moths in Switzerland during the past summer: in this letter the writer states that he feels certain the moth in question was not one of his Swiss captures, but was caught by his brother at Romsey, after his return from Switzerland.

Mr. Westwood made some observations on the usefulness of labelling insects at the time of capture, by which such instances of disputed identity as the present were avoided; he objected to the plan of employing a number referring to a note-book as commonly in use, as, in the event of dispersion of a collection on the death of the owner, such numbers became useless to all but the possessor of the note-book, and indeed instances had come under his notice in which the said book had been lost. He had always employed in his collection tickets bearing an abbreviation of the locality, as Ch. W. for Coombe Wood.

The President feared that Mr. Westwood's plan of abbreviations would be rather perplexing to any one but himself, unless accompanied by an index, which would be open to the same objections as the note-books which he had just condemned.

Some conversation ensued on the claims of Sphinx Pinastri to be considered a British species; during which Mr. F. Walker reminded the Meeting that Mr. Thomas Marshall, well known to many Members present as one of our most accurate observers, had himself seen this insect alive in Cumberland, and had recorded the fact in the 'Entomologist' some years ago.

Dr. Wallace exhibited two examples of Acosmetia caliginosa, taken by Mr. Grimstead in a wood near Ryde, Isle of Wight: he observed that the species had hitherto only been captured in this country in the New Forest.

The Secretary read the following paper by Mr. G. Wailes, of Newcastle:—

The Hybernation of Vespa vulgaris.

"It is very evident that we have a great deal yet to learn about the social wasps, and therefore the following remarks as to Vespa vulgaris may be interesting. Ever since 1829 I have, at intervals, searched the summit of Skiddaw (3022 feet) for specimens of Leistus montanus, and on every occasion have taken out from underneath the loose fragments of the slate perfectly torpid females of this wasp, with the wings, legs, antennæ, &c., precisely in the state in which we find them during winter in the lower lands. Not unfrequently I have met with dead specimens which seemed to have perished in the same dormant state, and been there for a year or two at least. Mr. Smith, in his 'Catalogne of the British Vespidæ,' under this species, states that 'Mr. Wollaston found the female abundant under stones on the extreme summit of Gribon Oernant, near Llangollen, in September, 1854,' adding 'probably hybernating for the winter,' but had evidently forgotten my writing him on the same subject. My visits to the mountain have extended from the latter end of June to the latter end of August, and therefore it necessarily follows either that these specimens of the female wasp were those of the previous year, or that this sex appears much earlier in the season than has been hitherto supposed. But in either case, the question arises why are they torpid during these the hottest months of the year? It is quite true that the temperature at the altitude is below that of the plains, especially during the night, and I have myself been enveloped in falling sleet and snow more than once, both in June and August, though as a rule the Cumberland mountains seldom have a thick covering of snow, and often only a few inches once or twice in a winter. Still, the temperature of ordinary mountains always approaches that of the plains in summer, and one would have expected was in Britain at least sufficiently high to rouse these wasps in their winter quarters, when every other insect under the same stones was active and stirring, and the air so warm and bright that Larentia salicata and Crambus furcatillus were sporting in the mid-day sun above them. Such, however, was not the case, and when turned out of their snug, dry quarters, they allowed themselves to be handled and put into pill-boxes just as they do in winter. We may therefore ask, when are these sleepers to awake? for as the ground temperature reaches its maximum during the months in which I have met with them, and Mr. Wollaston has found them in a similar state in September, when a declining temperature has set in, we must conclude that for that year all prospect of their subsequent issue from their retreats through the influence of heat is barred. Can this be called hybernation as it is usually understood? Or is there some other cause of torpidity besides mere cold? Or are we to conclude that when once put to sleep in these lofty regions they wake no more unless kindly removed into a milder clime by a stray entomologist, when, as I have always noticed, they become as active as those of the warm lowlands?

"I have searched in vain for the record of similar facts in other parts of Europe, where, doubtless, the same circumstances occur, and therefore I send this note to the Society with the hope of calling the attention of others to the subject."

Mr. Westwood considered that these female wasps had been the founders of colonies in the preceding spring, and after performing their maternal duties, had retired to die in the situations in which they were found by Mr. Wailes.

Mr. H. W. Bates communicated the following

Diagnoses of three New Species of Diurnal Lepidoptera belonging to the Genus Agrias, and of one belonging to Siderone.

"Wishing to dedicate one of the grandest new species of Agrias (a genus which he has done so much to illustrate) to Mr. W. C. Hewitson, I send the diagnosis for insertion in the 'Report of the Proceedings of the Entomological Society' for March, preparatory to the figures which Mr. Hewitson will publish in the April part of his 'Exotic Butterflies.' I add the diagnoses of two other new species which will be figured on the same plate, as well as of a species of Siderone, intended to be figured at some subsequent early date. All four species were taken by myself on the Upper Amazons, and belong to the most beautiful productions of that wonderful country. The discovery of the female of one of the species makes the present communication of some importance in a scientific point of view; as the non-appearance of females with the usual Nymphalideous structure of the fore legs in that sex, in the genera Agrias and Megistanis, seems to have excited doubts as to the constancy of that sexual character throughout the whole family, especially as two forms of males have occurred in some species having the usual superficial appearance of the two sexes (*e. g.* in Megistanis Bæotus). But the discovery of the females in the allied genus Agrias shows that the sexual character in the fore legs is precisely of the same nature here as in the rest of the family Nymphalidæ. The four species now characterized will be included in the 'Insect Fauna of the Amazon Valley, Part Diurnal Lepidoptera,' now preparing for publication.

"Agrias Hewitsonius.

"♂. Size of A. Phalcidon (Hewits. Ex. B.) *Above.* Black. Fore wing having at the base a large orange-coloured spot, rounded on its outer edge; followed by a broad belt of dark blue, extending from the costa to very near the hind margin; edged externally by a belt of six pale greenish lunules. Near the apex is a short belt of three dusky white lunules. Hind wings with a large subtriangular spot on the disk, occupying about half the surface, of the same blue colour as the fore wing.

"*Beneath.* Fore wing has an orange-coloured spot similar to the one on the upper side; the apex is of a pale greenish gray; the intermediate part of a dull black. Hind wing: the base to nearly the middle orange, the outer edge of the patch deeply sinuated in the middle. Rest of the wing pale greenish gray; a submarginal line, a central strongly curved macular belt, interrupted at the first median nervule; two short ones across the disk, and two spots in the middle of the cell, black. Between the central and submarginal belts is a row of seven large, equal, black ocelli, having white pupils (double in the anal one) and shining blue irides. Body above rufous-brown. Antennæ black. The female is considerably larger and less brilliant in colour, having also less blue colour on the disk of the hind wing.

"I took four specimens of this distinct species, at Ega, one male and three females. It is a very bold and rapid flyer, similar to the Preponæ and the Apaturæ of the old world. It is attracted, as well as one of the following species, by the sugary sap exuding from certain trees in the forest, where I have seen it feeding amongst a group of Incas and Cetoniadæ.

"Agrias Pericles.

"♂. Very similar in size and outline to A. Phalcidon. The hind wing, both above and beneath, offers not the slightest difference; the fore wing differs as follows: — *Above.* Fore wing black: the basal portion, to about two-thirds the length, occupied by a large spot of a beautiful scarlet colour inclining to orange. This is followed by an oblique belt of five elongated spots of a metallic-green colour, edged on the inner sides with brilliant dark blue. Towards the apex is a narrow belt composed of four small cream-coloured spots.

"I took one individual only of this species, in company with A. Phalcidon, at Villa Nova, in 1854. The specimen has travelled with me from place to place on the Upper Amazons for five years. I have considered it hitherto only an extraordinary variety of A. Phalcidon, but on further experience of the singular way in which species of this genus and of Catagramma differ from each other, I now prefer to consider it distinct. A. Phalcidon was not uncommon at Villa Nova, although I saw not a trace of it at any other locality. It flies high, and I never saw it descend towards the ground. It settled on leaves of trees about fifteen to twenty feet from the ground, in the broad alleys of the glorious forest at that locality, and could only be captured by attaching a long pole to the bag-net.

"Agrias Sardanapalus.

"♂. In size and shape of wings very similar to A. Claudius, of Rio Janeiro. The under surface of the wings does not differ in any way from that species: above, the colouration is very different. Fore wing black; the basal portion having a large triangular spot (occupying about three-fourths the surface of the wing) of a rich carmine colour, glossed with cobalt-blue, in certain lights. This is followed by a belt of the most beautiful blue colour, leaving only the apex and a narrow outer margin black, the former of which has a short belt of three large indistinct pale spots. Hind wing has the base and the margins narrowly black; the disk entirely of the same rich blue as the belt across the fore wing.

"I took two of this very richly coloured species, one at Ega and one at St. Paulo: one of them is in the collection of Mr. W. C. Hewitson and one in my own. I saw only four individuals during four years' residence and travel on the Upper Amazons.

"Siderone Mars.

"♂. Considerably less in size than S. Ide. The fore wing has the apex more more falcate than in that species; the outer margin much more strongly rounded, leaving the hinder angle indistinct; the hind wing also is shorter.

"*Above.* Deep black, with two clear white spots near the apex. A large oblique belt of carmine crosses the wing from the costal edge to near the hind angle; its costal part dilated towards the extreme base of the wing. Hind wing black Two conspicuous rounded red spots near the middle of the costal edge. Anal lobe gray.

"*Beneath.* The base and apex of both wings are of a rich rufous-brown. The discal portion is glossy brownish gray, irrorated nearly throughout with rufous-brown. The hind wing has a broad belt across the middle, of a shining ash-colour, spotless. The apex of the fore wing has a belt of white and lilac-coloured spots.

"I only saw one individual of this species, at St. Paulo, near the frontier of Peru. Like all the other species of Siderone and Paphia, it has the rapid flight of the typical Nymphales, and, like them, not easily scared when reposing, pertinaciously returning to the same spot after being driven away. Its near relative, Siderone Ide, so common in the West Indian Islands and Guiana, also occurs in the country, but is very rare."

The Secretary read the first part of a paper by Mr. H. W. Bates, intituled "Contributions to an Insect Fauna of the Amazon Valley."—*E. S.*

Food-plant of Eupithecia pallidaria.—I posess specimens of this insect bred from larvæ found in Kent, by Mr. Gotham, on Solidago Virgaurea. I think this is the first instance of its having been bred, though I believe that the Rev. Mr. Crewe has it now in pupa.—*R. M'Lachlan; Forest Hill, March* 6, 1860.

Larvæ of Eupithecia desired.—If any of the readers of the 'Zoologist' can send me, during the ensuing season, larvæ of Eupithecia rectangulata, or eggs of the following species—E. pulchellata, E. pumilata, E. pernotata, E. pygmæata, E. plumbeolata, E. pusillata, E. consignata, E. constrictata, E. helveticata, E. viminata, E. subciliata, E. irriguata, E. togata, E. indigata, E. debiliata, E. egenata, E. succenturiata (not subfulvata), or Collix sparsata—I shall feel deeply indebted to them, and will endeavour to make them any return in my power.—*H. Harpur Crewe; Wickham Market, Suffolk, March* 6, 1860.

Entomological Terms.—In compliance with the wish of my friend the Rev. Mr. Pickard-Cambridge, I offer a few brief observations on the subject of the entomological terms alluded to by him (Zool. 6893); I fear, however, that I do not possess sufficiently clear powers of definition to throw much light on the subject, and that I have so often myself, when using them, been guilty of laxity and want of uniformity that my authority is worth nothing. I should wish to see a far more accurate and methodical pen than my own engaged in the task, for instance that of my friend Mr. A. G. More. With regard to the terms "very common," "common," "frequent," "not rare," "occasional," "rare," "very rare," it would be alike presumptuous and superfluous in me to add a single word to Mr. Pickard-Cambridge's definition, which are as perfect as they are complete. I therefore proceed to some of the other terms subsequently alluded to by him, giving my own private interpretation thereof. As this is very likely quite erroneous, I hope none of your readers will be sparing in their criticisms. I begin, then, as follows:—*Tribe*, the grand primary division comprehending all the others, and giving a general idea of the thing designated; example, insect. *Order*, a collection of numerous widely-differing groups, but yet possessing certain peculiar characteristics common to all; example, Lepidoptera. *Class* or *group*, a collection of families possessing very similar characteristics; example, Bombycina. *Family*, a collection of various closely-allied genera; example, Notodontidæ. *Genus*, a collection of very closely-allied species; example, Notodonta. *Sub-genus*, one possessing the main characteristics of the genus, but yet, in the opinion of some authorities, sufficiently distinguishing peculiarities to warrant its being separated from it; example, Drymonia. *Species*, each of the one or more distinct individuals which make up the genus or sub-genus; examples, dromedarius, dodonea. *Variety*, a

frequent yet abnormal aberration from the typical characteristics of the species, not confined to any peculiar soil or locality; example, Miana strigilis, *Lin.*, var. Æthiops, *Haw.* *Permanent variety* or *race*, a variety confined to particular localities, and hereditary in all its distinguishing peculiarities; example, Noctua conflua, *Tr.*, and Lycæna Artaxerxes, *Fab.*, which by many entomologists (of whom I am not one) are considered more northern varieties of N. festiva, *W. V.*, L. Agestis, *W. V.* *Lusus* or *sport*, an unusual and extraordinary divergence in colour and markings from the typical characteristics of the species; example, a black specimen of Chelonia caja or C. villica, *Linn.* I am almost ashamed to offer these defective and inaccurate definitions to your readers; but, as I said before, I hope no one will hesitate to set me right wherever he thinks I am wrong. One word in conclusion, respecting the term "race" or "permanent variety," which has lately become so common. The opinion which I expressed (Zool. 6247) has in no way altered. As far as Lepidoptera are concerned I do not believe in the existence of these "permanent varieties." I have never heard, read or seen anything which convinced me; and I think the conclusion rests upon most insufficient evidence. We heard a great deal, some two years since, about T. crepuscularia, *W. V.* (laricaria, *Doub. Cat.* 1st ed.) being a race of T. biundularia, *Esp.* (crepuscularia, *Doub. Cat.* 1st ed.), and M. rivata, *Hub.*, a mere permanent variety of M. subtristata, *Haw.* (alchemillaria, *Doub. Cat.* 1st. ed.); but the whole four species have been carefully bred from the egg during the past season, and proved to be indubitably distinct; and I believe that the further and closer experiments are carried the more plainly will the theory be shown to be fallacious.—*Id.*

On the Transverse Fission of Aiptasia Couchii. — Mr. F. N. Broderick's communication to Mr. Gosse on the transverse fission of Aiptasia Couchii (Zool. 6911) is of very great interest, and, I believe, the first recorded notice of that mode of increase in the Actiniadæ. In his 'Actinologia Britannica' Mr. Gosse has properly placed this animal between Sagartia and Anthea, genera in which fissiparous reproduction is frequent, although after different fashions. In Anthea the fission is vertical, separating the polype into two distinct halves, each possessing its share of fully-developed internal and external organs; fissiparous increase in Sagartia, on the contrary, consists of the detachment of little ragged bits, only from the base of the animal, and may be considered as an irregular mode of budding, since the separated parts at first contain no specialised structure, but only the vital power requisite for its development. The division in Aiptasia partakes of the character of both these forms of increase, like that in Sagartia from taking place only at the base, and Anthea-like in being a complete section of the body, although a transverse one; each portion also being to a certain extent complete in itself. With regard to the mode of increase of Aiptasia in the Zoological Society's collection, I think Mr. Broderick must have been misinformed, perhaps by some one who was *locum tenens* for the regular attendant during the important hour of dinner. There are now three specimens of this polype in one of the centre tanks, the two smaller examples being the produce of the other, and, as Tennent, the keeper, has often told me, the result of transverse fission. The first young one was so small and well-proportioned that I could hardly believe it had been produced in any other than the usual manner; but the second had a very different shape. It appeared last August, and when three days old the body was very short and thick,

and I could observe traces of budding tentacles at its upper margin. The three polypes now only differ from one another in size. Since the keeper first called my attention to this transverse fission we have frequently discussed the subject, and my scepticism has been gradually diminishing; now, Mr. Broderick's interesting observations, of course, are conclusive on the point.—*E. W. H. Holdsworth; 26, Osnaburgh Street, March 7*, 1860.

Notices of New Books.

The 'Ibis,' a Magazine of General Ornithology. Edited by Philip Lutley Sclater, M.A. London: Trübner & Co. 1859. 490 pp. Price 21*s.*

The first four numbers of the above ornithological magazine are now before us, and we have delayed our remarks upon it till the completion of the first volume, partly from a desire to know whether it would continue to maintain the high tone of merit with which it began, before we lavished our commendations, which might have proved premature; and partly from a confident expectation, in which we have not been disappointed, that the fourth number might contain a preface, stating the origin and object and intention of the work. Now, however, that the bark is fairly launched in the waves, and vol. i. of the 'Ibis,' stands forth to sink or swim according to its merits, we would devote a short space to a brief examination of it; and we do not hesitate to state at once that it has our unqualified praise, filling, as it does, just the gap which has so long existed in this country, but which has been ably supplied in Germany by Cabani's 'Journal für Ornithologie,' and Bädeker's 'Naumannia,' *viz.*, that of a sound and scientific periodical, devoted exclusively to Ornithology, and which we have little doubt the large and rapidly-increasing body of inquirers into that fascinating branch of the zoological kingdom will not only amply support but hail with considerable satisfaction. Neither have we any fear for ourselves that the 'Ibis' will in any degree interfere with the 'Zoologist;' for the whole intention and tone of the work is so distinct, and has such a very different aim, grasping, as it does, the Ornithology of the world, and dealing with matters quite irrelevant to our pages, that we see no reason why the 'Ibis' and the 'Zoologist' should not go hand in hand, helping and supporting one another; for while we willingly resign to the sacred 'Ibis' the deeper and more elaborate discussion of material too heavy and scientific for a popular magazine such as the 'Zoologist' especially claims to be, we cannot

doubt that we shall still be the receptacle of those many interesting anecdotes and facts with reference to the feathered race, no less than in the other departments of the zoological world, which we have now for seventeen years been the vehicle of conveying to the public; and we have the greatest confidence that our contributions will not fall off in this respect, and that we have so far the good will of the promoters of the 'Ibis' that they regard us with the same friendly feeling which we entertain towards them; and so we are disposed to feel an Egyptian reverence for the "religious fowl," and hail its advent among us with delight.

And now we proceed to state the origin of this new work, which we extract from the preface that its promoters may tell their own story in their own words. It seems that "for some years past a few gentlemen attached to the study of Ornithology, most of them more or less intimately connected with the University of Cambridge, had been in the habit of meeting together, once a year, or oftener, to exhibit to one another the various objects of interest which had occurred to them, and to talk over both former and future plans of adding to their knowledge of this branch of Natural History. These meetings being entirely of a private and social nature, were found agreeable by those who attended them, and gradually became more frequented. In the autumn of 1857 the gathering of naturalists was greater than it had hitherto been, and it appeared that among some of those present there was a strong feeling that it would be advisable to establish a magazine devoted solely to Ornithology." This feeling was distinctly stated not to have been "prompted by any jealousy of periodicals already existing, but by the belief that the number of persons who turned their attention principally to this one branch of Zoology was at any rate sufficiently great to justify an experiment, which in a neighbouring country, and among a kindred nation, had succeeded so well." The scheme suggested in 1857 was reconsidered and approved at the annual meeting at Cambridge, in November, 1858, when, "after due consideration, it was determined by those present that a Quarterly magazine of General Ornithology should be established, that a limited subscription should be entered into to provide a fund for that purpose, and that the subscribers should form an 'Ornithological Union' their number at present not to exceed twenty." The names of these twenty valiant knights who take the Ibis for their standard, and are ready to do battle in defence of their ensign, are appended; and it is but fair to add that they embrace some of the very best of our British ornithologists, naturalists, moreover, of the field as well as of the closet,

and who have pushed their investigations and learned their lessons in all parts of the world;— no carpet knights but knights errant in good truth, who have given proof in this first volume of their prowess and brilliant achievements from the icebound coasts of Spitzbergen, and the inhospitable snows of Lapland, to the burning shores of the Red Sea, and the tropical districts of Central America and the West Indies.

To take a rapid glance at the contents of the volume before us, and beginning with Europe, we have a graphic account of the discovery of some nests of the black woodpecker (*Picus martius*) in Sweden, by Mr. Simpson; admirable papers on the breeding of the smew (*Mergus albellus*) and of the crane (*Grus cinerea*) in Lapland, by Mr. Wolley, of which more anon; and notes on the birds of Western Spitzbergen, by Messrs. Evans and Sturge.

Passing on to Africa we are not surprised to find that continent more especially favoured by the devotees of the Ibis, and here we have papers on the feathered inhabitants of the Great Desert of the Sahara and of Northern Africa, generally from the truthful pen of the Rev. H. B. Tristram, who has passed several winters in those localities. Also a narrative of five months birds'-nesting in the Eastern Atlas, by the cosmopolitan, Mr. O. Salvin; Ornithological Reminiscences of Egypt, by Mr. Taylor; and Lists of Birds from Ibadan in Western Africa, and Natal in South Eastern Africa, by Mr. Gurney, than whom no one has a more general knowledge of birds, more particularly of the Raptorial order.

The continent of Asia has hitherto been little noticed by contributors to the 'Ibis,' Mr. Tristram's paper on "Birds observed in Southern Palestine," and Mr. Gurney's "List of Birds of Prey from Beyrout," comprising all from the East, though perhaps there is no field which promises so rich a harvest to future explorers, which has been so little trodden hitherto, and which we trust to see taken in hand by some of the more adventurous members of the British Ornithologist's Union than Asia generally, more especially the districts bordering on the Caspian, and the great kingdom of Tartary.

Crossing the Atlantic, the Western Hemisphere is not without its investigators; first and foremost we have the "Ornithology of Central America" by the excellent Editor (to whom we would pay a passing compliment on his success in nursing the infant 'Ibis' through its first year, no slight task, the delicacy of the bird and our uncongenial climate considered), wherein he has been ably seconded by Mr. Salvin, who is now, for the second time, examining the Fauna of the Central

American isthmus. And again we have some very interesting and well-written notes on the birds of the West Indian island, St. Croix, by the brothers Messrs. A. and E. Newton, both well known and esteemed by the 'Zoologist,' and both of whom have at different periods visited the island they describe.

These are some of the principal contents of the volume, giving an insight into the Fauna of other countries, but they are interspersed with many another paper on kindred subjects, among which we hailed with delight contributions from the well-known pens of Mr. Eyton and Mr. Knox, and the not less valued pencils of Mr. Hewitson and Mr. Wolf, while the short account (with which each number concludes) of recent ornithological publications, abroad as well as at home, leaves nothing to be desired on this head, and amply fulfils the promise of the preface to "keep its readers acquainted with the progress of ornithological science in all parts of the globe."

There is yet another very able article which we cannot pass over, viz., a "Review of Mr. Bree's Birds of Europe not observed in the British Isles." The reviewer begins his task in a business-like manner, and brings considerable ability and general ornithological knowledge of evidently a very high order to bear; but though we admire his masterly handling of his subject, and agree with him in the main, we could have wished a little less severity, and a little more deference to the opinions of others, than such dogmatic assertions and sweeping denunciations imply, more especially when the reviewer bears witness to much excellence in the book, and sums up several pages of severe censure by declaring that Mr. Bree deserves "a very high degree of praise."

We have now touched upon the general contents of the first volume of the 'Ibis,' and we trust we have sufficiently pointed out its sweets to tempt those of our readers who have not already done so to taste and try for themselves. It is not our intention to follow the writers through their several articles, which would be to take an ornithological tour over the four quarters of the globe; neither where so many are deserving of praise would we particularize those papers chiefly worthy of merit, or institute comparisons which are generally odious; one exception, however, we must make, which can provoke no jealousy, when we specify the two very able articles of our highly valued, and now deeply lamented, correspondent, the late Mr. Wolley: his untimely death, for he was cut off in the very flower of his age, must have excited the bitter regret of all true naturalists, even if they did not enjoy his personal friendship; for who that claims to have any sympathy

for Ornithology can have been ignorant during the last few years of the name of John Wolley, so highly honoured not only in his native country, but in Europe, as one of the most indefatigable and successful explorers of the nesting of those birds which—seeking the highest Arctic latitudes —have baffled the hitherto cursory researches of former inquirers; and who has been content to encounter, during several seasons, the rigours of an Arctic winter; fixing his abode in Lapland, on the confines of Finmark, for the express purpose of being on the spot for the nesting of the earliest breeders, before the snows had disappeared in the spring, and communication with more southern latitudes was feasible? Truly, not only the members of the "British Ornithologist's Union," but naturalists generally have sustained an irreparable loss in the death of one so zealous in the cause, and withal so acute an observer, so diligent in instituting inquiries, so painstaking in sifting information, so discriminating, so careful in admitting a doubtful point as a fact; above all, so accurate in apparent trifles, the thousand little points which constitute the very soul of all scientific inquiry, and are of such immense importance in arriving at truth, where less laborious research, and too rapid jumping to conclusions are so apt to mislead into a labyrinth of error, and propagate falsehood instead of facts. Now the two papers by Mr. Wolley in the 'Ibis' are admirable proofs of this accuracy and diligence, and we would point them out as especially worthy of imitation, for in addition to their intrinsic value as records of the breeding of birds whose nidification was but little known, viz., the smew (*Mergus albellus*) and the crane (*Grus cinerea*), and over and above the intense interest wherewith Mr. Wolley has contrived to invest his plainly-told statements, there is such a spirit of truthful detail, such evident accuracy pervading each paper, that we may safely assert no one can rise from their perusal with a doubt on his mind that the author can have been deceived in any one particular which he has stated: witness his remarkable caution, we had almost said unwillingness, to admit the eggs brought as those of the smew, and the several links of evidence he picked up, till a chain of proof was formed which left no room for suspicion: witness again his admirable patience and tactics, worthy of a field officer, in mastering by ocular proof all the details of the nesting of the crane. We would again call particular attention to this careful regard to the smallest minutiæ in dealing with little-known facts and in pushing zoological inquiry, as of the last importance in helping to conclusions, and as worthy of all imitation; though we know not where to look for an ornithologist so remarkable in these respects as Mr. Wolley, as

assuredly we must long look in vain for one whose mind will be so richly stored with Scandinavian Ornithology, which we had fondly hoped would have proved both to the 'Zoologist' and the 'Ibis' an inexhaustible mine for many years to come, but which will now we fear in a great measure, if not altogether be lost.

But to return to the "Ibis," and to peck at her with little reason indeed, but in the snarling spirit in which critics are said to delight. We have heard the question repeatedly asked, and we have never heard a satisfactory answer, "Why the 'Ibis'?" and "What could have induced British ornithologists to travel out of their way to Egypt for a title, and to assume as their symbol the bird long ago sacred to the worshippers of Isis, and whose name and figure at once and involuntarily lead the mind far away from Britain to the banks of the Nile?" We confess that we share these murmurs of discontent, and could have preferred the designation first suggested of "Aves" as more appropriate and more descriptive of the book; for though the quibble is trifling, and it may be retorted "What's in a name?" and "A rose with any other name would smell as sweet," we own to a decided prejudice in favour of a good nomenclature, and vastly prefer the title which carries its meaning on its face.

With the next grievance which we have heard mentioned we have no sympathy, and we repeat only to refute it; for though some think the price excessive, and the figure 6*s.* looks somewhat high on the cover, especially when the double number (No. 4) was marked 12*s.*, yet if we take into account the quantity of matter promised, viz., an annual volume of about 400 pages, and above all the coloured plates, to the number of at least twelve, we feel satisfied that subscribers of £1 1*s.* have no right to find fault, for they receive to the full amount of their subscription; and for ourselves we would infinitely prefer a few really good plates (and there are some admirable ones in the volume before us) to any amount of ordinary ones, executed by less able artists. This year at any rate we can have no room for complaint, for the editor has more than kept faith with the public in giving 490 pages in lieu of 400, and 15 plates instead of 12.

We would only suggest two cautions, and we have done; the first, that the 'Ibis' be punctual in its periodical appearance, not deferring its arrival on the appointed day for any consideration, symptoms of which dilatory lagging we observed in No. 4; and again, that in aiming at a high standard it avoid too prosaic and didactic a tone, remembering that statistical facts may be dry and dull, and require lubrication, a judicious mixture of the *dulce* and *utile*, as that great

master of human nature, Horace, suggests; this, however, is a caution we give with considerable diffidence, for let us not be misunderstood to desire any dilution of the matter provided, nor in a purely scientific work would we sacrifice anything to mere popular reading; only let there be a careful and judicious arrangement of the material, and let it be conveyed in a pleasing form and in well-chosen language, minutiæ these often overlooked as of comparatively trifling importance, and yet not to be disregarded even in the most abstruse and scientific disquisitions.

With these friendly remarks we close our examination of the first volume of the 'Ibis,' heartily commending it to our readers, and trusting it will continue in the same masterly manner in which it has begun. A.

Botanist's Corner.

Question as to the Species of the British Cyclamen. — Botanical subjects do not usually appear in the 'Zoologist;' but, being a Journal which I have long known and constantly read, I wish, if the indulgence may be allowed, to inquire through its pages what species of Cyclamen it is which in a few instances has been found wild in England, or whether we have more than one species? I believe that all our published Floras give it as C. hederifolium of Willdenow; but it appears to me that nearly all of them, since Smith's 'English Flora,' have confounded Willdenow's plant with C. neapolitanum of Prof. Tenore, — that whilst they quote the former as synonymous with theirs, their description is that of the latter. The two species are clearly distinct: in C. neapolitanum the mouth of the corolla is circled with projecting teeth, and its time of blossoming is the autumn; C. hederifolium is without these dental appendages, and blossoms in the spring. The following localities are given in our Floras and other books: Bramfield, Suffolk, on a bank of wet clay; Sandhurst, near Cranbrook, Kent; Stockpole Court, Pembrokeshire; also somewhere in Nottinghamshire, and in Sussex. Hitherto I have failed, by private inquiry and correspondence, to obtain the desired information, except that my friend James Atkins, the originator of the beautiful hybrid Cyclamen which bears his name, has informed me that he has received both leaves and flowers from the Stockpole Court locality, and that they are undoubtedly those of C. neapolitanum. I therefore hope that, through the readers of the 'Zoologist,' some further light on the subject will be, sooner or later, obtained. If the time of blossoming at any place could be ascertained, that alone would be, I believe, sufficient to determine the species for that locality, whilst other localities may produce another species; for though it has been stated that C. hederifolium will sometimes blossom in the autumn as well as in the spring, I believe the statement to be contrary to the experience of all cultivators, and that it is an error which has arisen from the confounding of this species with one or more of the autumnal-flowering species.—*Thomas Clark; Halesleigh, January* 17, 1860.

Occurrence of a Rare Bat, the Barbastelle (Barbastellus Daubentonii) *in the Neighbourhood of London.* — On the 3rd instant, when taking my first entomological walk this season in Richmond Park, I fonnd clinging to the trunk of a large oak a bat of this rare species: it was in a state of semi-torpidity, basking in the warm sun. I think the cause of its leaving its winter quarters thus early, after so cold a season, was attributable rather to the extreme discomfort it must have suffered from the multitude of vermin with which it was infested, rather than from a very slight rise of temperature.—*Robert Mitford; Hampstead, March* 21, 1860.

Account of a Species of Phalangista, recently killed in the County of Durham. By John Hogg, M.A., F.R.S., F.L.S., &c.*

On the 22nd of August last, a son of the rector of Redmarshall, a small village in the county of Durham, brought to me at Norton, distant four miles to the east of that place, a recently killed and singular looking animal. At first sight, the only British quadruped which it at all resembled, and that chiefly from its dark-coloured tail and yellow breast and belly, is the yellow-breasted pine martin. Of this animal I have never seen a fresh specimen—only one, a good while ago, preserved in a museum. On a very slight examination, I however found, from the two large front teeth in the lower jaw, that it could not be a species of the Mustelidæ; but it seemed (if such an animal were possible) a mule between a yellow-breasted martin and a squirrel or a rabbit; the teeth and the general aspect affording characters of some such anomalous creature. Yet, on a closer examination of its feet, and especially of its hind ones, and of its long black tail, which was evidently prehensile at its extremity, I found that it could not be any British quadruped, but some New South Wales, opossum-like, or marsupial species. Had it been a female, I should at once have detected the pouch, or marsupium, or some distinct marks of one. I need hardly add, that if I ever before had had an opportunity of examining with the least attention any species of the opossum tribe, I could not for a moment have entertained the remotest idea that it could be referred to any indigenous quadruped in Great Britain. This marsupial animal consequently could only have escaped from confinement.

The gentleman who brought it to me said it had been killed the

* This paper (without the postscript) was read, on September 19th, to the Natural History Section, at the Meeting of the British Association at Aberdeen. Communicated by the Author.

evening before, whilst it was upon a tree on a farm near Redmarshall. The farmer, supposing that it was some savage carnivorous animal, which would destroy all the poultry in the neighbourhood, and especially, as at the time when he first noticed it, it was following some hens or chickens, he therefore, with several other men, went in pursuit of it, and at length succeeded in killing it, though not "up a gum-tree," but up a "poplar-tree," where it had made a nest with straw.

I may here add that the common opossum (*Didelphis Virginiana*) is known to attack poultry and to devour birds' eggs. So then, had the Redmarshall farmer imagined that the strange wild beast he saw to be an opossum, he would have had very good grounds for fearing the destruction of his poultry.

I will now briefly give a description of it. The length, from the tip of the nose to the base of the tail, $18\frac{3}{4}$ inches; the length of the tail about 13 inches, and the entire length $31\frac{3}{4}$ inches.

The dentition I found as follows: — Two large front teeth or incisors in the lower jaw somewhat curved inwards, and like those of rabbits and squirrels. Six incisors in the upper jaw, then two small canines — the first apart from the second, and also larger than the second; and four or five molars. The first of the molars in each jaw is somewhat compressed and of a cone shape; but the exact number of the latter I could not determine as the animal was stiff, having been so recently killed, and I did not like to force open the jaws. In the lower jaw are no canine teeth, but near the base of each of the two long incisors there appears the rudiment of a canine tooth; also the same number of molars, most likely five. If so, the dental formula of the upper jaw would be = 6 inc. + 4 can. + 10 mo. = 20 in all; and that of the lower jaw = 2 inc. + 0 can. + 10 mo. = 12 in all; and these altogether make thirty-two teeth. Legs rather short. Front foot with five long toes, and five curved, sharp and compressed claws; of these toes the two central are the longest. But the hind foot has only two large toes and two claws; and also, on the inside, a third toe, divided into two as far as the last phalanx, or at least the two are united by the skin up to that phalanx, and they have both long, sharp and compressed claws. Then beyond, again, on the inside, and placed more backward, is a large and broad thumb, though without any claw or distinct nail. The feet, of a brownish yellow, having much the character of hands, are evidently those of a climbing animal; and the same may be said of the tail, for it is prehensile, is

curved inwards at the tip, and is devoid of hairs upon and under that portion.

The skin on each side of the flank, near the hind thighs, I observed to be somewhat loose and extensible, and thus, perhaps, indicating some rudiment of the loose lateral skin, which is so conspicuous in the flying opossums.

In colour, the upper portion of the body is gray, mixed with some brown and black hairs; the neck, breast, belly, and inside of the legs are yellow, with a rusty red spot and line down the breast, which extends under the forelegs. The cheeks are orange. Tail thick, black and hairy. Insides of the ears pinkish, nearly bare of hairs.

Length from the nose to the ear about $3\frac{1}{4}$ inches; and that of the ear about $2\frac{3}{4}$ inches; width of the same in the middle $1\frac{3}{4}$ inch.

This male specimen appeared to be fully grown; but as the teeth were little worn and the claws so sharp, he was evidently of no age—the general appearance of the animal being not unlike a small gray fox, though less sharp across the muzzle and with shorter legs. I found in Bewick's 'History of Quadrupeds,' (Edit. 4, 1800), p. 435, a species of marsupial from New South Wales, called the "vulpine opossum," which in dentition and description seems to agree with it. He describes it thus: —"Upper part of the body grisly, consisting of dusky, reddish and white hairs; the under parts light tawny, two-thirds of the tail black, a blackish space round each eye, and long black whiskers."

And in Cuvier's 'Règne Animal,' the same animal is, I conclude, that named "Le Phalanger Renard" (*Phalangista vulpina*). There is, however, another species of Phalangista which is likewise indigenous in New South Wales, called P. fuliginosa, or the "sooty phalangista," which, in some characters and dimensions, resembles it.

Bewick has not given a figure of the "vulpine opossum;" and I must therefore wait until I visit the British Museum and Zoological Gardens, in November, to determine with which of the two species it is to be identified; but from the descriptions that I have as yet seen, it appears to correspond best with the fox-like Phalangista, which I believe is commonly called, in New South Wales, the "brush-tailed opossum."

A bird-stuffer, at my neighbouring town of Stockton, has preserved the skin; but, as it was not finished and sufficiently dried, I could not bring it with me to exhibit to the Section.

Some of the Phalangistæ, being chiefly vegetable feeders, are eaten by the natives of Australia: I inquired of the stuffer, if the flesh was

dark, but he told me it was more like that of a rabbit; I am sorry that I neglected to ask him to examine the contents of the stomach whilst he was skinning the specimen.

Postscript.—Soon after my return home from Scotland, the owner of this animal, hearing of his capture, wrote (October 1st) to me the following particulars respecting him.

He had been brought from Australia not many months before; he had escaped from his new home in a house at Aycliffe, distant about seven miles west from the place where he was killed, after wandering for fourteen days. He was caught by a shepherd in Australia, when a very few (perhaps four) weeks old, and was considered to be about seventeen months old. The letter ends—"Your conjecture respecting the name is quite correct, as it is a specimen of the brush-tailed opossum."

Having lately visited the British Museum, I found that the Phalangista vulpina, of which there are many stuffed specimens in the Mammalia Saloon, is a slighter, more elegant and delicate animal, with smaller limbs and a finer fur; and in its head more like a small fox, though much of the same colour as mine, and that the Case 55 contains two or three gray examples of the Phalangista fuliginosa, which much more resemble my specimen. I have therefore no doubt that this animal is a young male of the sooty phalangista in its second year of coating, and before it had attained to its specific dark, or brown-black colour. The fur is rougher and coarser, and the animal is stouter and larger in some of its dimensions, and is altogether less interesting than P. vulpina.

I have also just seen three living specimens in the Zoological Gardens of the fox-like and one of the sooty phalangista — this last in his black fur, and they quite confirm my opinion. They appeared gentle and quiet creatures, and were feeding on cabbage, carrots and soaked bread; they gnawed off largish pieces of these substances, and, holding them in their fore-feet, were leisurely eating them after the manner of squirrels. They had good beds of straw in their cages, and the keeper told me they must be kept warm in the winter.

Mr. Waterhouse, in his 'Natural History of Mammalia,' vol. i., p. 291, gives the length of P. fuliginosa, as 22 inches from the nose to the base of the tail, and of the tail 14 inches = 36 inches in all; and of another, as 18 inches 6 lines, and 12 inches, or 30 inches 6 lines altogether; and this last, he says, was a light gray, and entirely corresponded in colour with P. vulpina. He further men-

tions other individuals as being intermediate in their colouring between the sooty and the gray specimens. It is consequently evident that the P. fuliginosa is a very variable species, much influenced by age, and perhaps by food and temperature. Indeed, Mr. Waterhouse (p. 293) believes that P. vulpina and P. fuliginosa are specifically identical; although I understand Mr. Gould considers them as distinct.

One of the earliest descriptions of the former animal, written by the celebrated John Hunter, is in the Appendix to White's 'Journal of a Voyage to New South Wales,' p. 278 (Lond. 1790), where the native name of "Wha Tapoau Roo" is given, and it is accompanied with a neatly coloured etching; but the figure intended for the same species, p. 150 in 'Phillip's Voyage to Botany Bay,' published the year before, is extremely bad.

Remarks on the Winter Visits to the British Isles of European Summer Migrants. By JOHN R. KINAHAN, F.L.S., M.R.I.A.*

THE migration of birds has been from earliest times an object of attention and admiration even to the unscientific. I need not more than allude to the frequent references to, and accurate descriptions of it, which occur in the oldest classics; and even among unlettered savages at the present day we find the migrations of birds anxiously watched for, and in some cases accurately predicted. It is therefore no matter of surprise that scientific men should have long ago made its phenomena a subject of study, and have traced many of its laws. There are, however, certain anomalies in distribution, in reference to the occurrence, at irregular intervals, of species which, in closely adjoining countries, are migratory. These, it appears, have not attracted as much attention as they deserve, and are connected with migration. Of these the most remarkable is that to which the title of this paper refers, viz., the occurrence of summer migrants in winter. Before entering on this subject, however, it will be necessary to lay down briefly what is here understood by migration in birds. In a former communication (Proc. Dubl. Nat. Hist. Soc. vol. ii. p. 91), when treating on the distribution of ferns in Ireland, three general laws were enunciated as governing the distribution of organized

* Read before the Natural History Society of Dublin, January 13, 1860. Communicated by the author.

species. These were: — That all species require a certain fixed *standard* amount of the great physical agents for their *due* development; that this standard may be altered within certain limits without destruction to the species, though at the expense of its well-being (*range of existence*); and lastly, that there are certain fixed limits to this range outside of which the species must absolutely perish. Now, remembering that the standard of existence is not necessarily uniform in different species, nor even at different ages of the same species (the standard of existence in the adult bird having a more extensive range than in the young), and bearing in mind that the food of the two differs greatly in quantity, *periodic migrations* that is, those strongly-marked passages, at fixed periods of the year, of species from one area to another, are easily explained, excluding at present those migrations in which the passage performed is merely a shifting from one district to another similar one, necessitated by the failure of food.

Taking such a view of the case, migration resolves itself into this: a species (the whitefronted goose, *Anser albifrons*, for instance) rears its young in the North during the summer season of that region, when food of the kind suitable for those young is easily procurable; after the young are fully developed winter sets in, and either destroys that food or renders it unattainable or nearly so. The species, flying the winter, travels south; finding in its course conditions pretty similar to those which prevailed in its summer abode in more northern latitudes: when at length it has reached a district (suppose Great Britain) in which these conditions, or at least conditions compatible with its adult existence are permanent in the winter, it there abides until the increasing heat of the spring renders its adopted home unsuited to it, or, at least, to its future progeny. Again it takes up its journey, travels north, flying from the summer heat; such a species arriving here in the winter the Briton calls a winter migrant. A second species (the house swallow, *Hirundo rustica*) rears its young in Britain; this duty over, on the appearance of the British winter, it seeks in the milder latitudes of the South its winter quarters, returning again to the North when these prove too hot to hold it; and such a species the Briton calls a summer migrant.

This explanation is not contradicted by the occasional breeding and residence, through the entire year, of individuals in districts intermediate between the actual northern and southern hiemal and æstival residences of the species, because it must be remembered that *the limits of the standard of existence* of a species are sometimes very

extended, occasionally almost equally so with the limits of the *range* of its existence; also that the climate of every part of the districts passed through in migration are not either uniform nor uniformly constant in each year, and hence that it may occur that a bird in its northerly progress, from some cause or other late in its migration,—as for instance, a weakling left behind at the annual starting point, whence all the stronger birds pushed boldly forwards for the North,—may, on finding the instinct of nidification too strong upon it, build its nest in the first spot which copies its proper summer region sufficiently near to fall within the extreme limits of its standard of existence, or even in a district which, whilst falling within the range of its existence, is yet excluded from this standard.

That summer and winter migrations take place almost always, if not always in a line due north and south, is an argument in favour of this explanation. I cannot call to mind a case in which nidificatory migration is markedly east and west over an extended area. In some few cases, it is true, the line of migration is not bounded by strictly parallel longitudinal lines east and west, but this might have been premised, since neither can areas similar in their climates be bounded by parallel lines, but in tracing such, northwards or southwards, we meet with divergent outlying sub-areas which copy the climates northward or southward of them rather than those adjacent to them in a direct line. Such exceptions are, however, rarer than might have been expected.

A few instances selected from among the birds of the British Isles (as these have been best studied) and of these choosing species, which occurring north in Great Britain, might have been expected to occur in Ireland also, but do not, will suffice to illustrate this.

Nightingale (*Sylvia luscinia*) occurs in Cumberland (Carlisle) Lancashire, Yorkshire, Lincolnshire, Norfolk, Suffolk, Essex, Middlesex, Kent, Somerset, Hants, Sussex, and East Devon. It is common only in the easternmost of these shores, being rare in Cumberland, Lancashire, Somerset and East Devon, unknown in West Devon and Cornwall; apparently so in Scotland, certainly in Wales. North of Britain it occurs in Sweden, Russia and Siberia; and south, in the eastern parts of France, Germany and Spain, wintering in North Africa, Egypt and Syria; unknown in the Channel Islands and Brittany. Now, if these points be connected on the map, it will be be seen that the regular line of migration is to the eastwards of a line which cuts off Ireland, Wales, Scotland and part of England.

Red-backed Shrike (*Lanius collaris*) occurs in Cumberland,

Wales and the South of England, not in Scotland. North; in Russia, Sweden, Denmark. South; in Germany, France, Spain, North Africa and Cape of Good Hope. Its line of migration being slightly to the westward of the nightingale, but still excluding Ireland.

Pied Flycatcher (*Muscicapa atricapilla*), in the like manner, whilst extending as far North as Scandinavia and Central Russia, is rare in the south-western shires and unknown in the north-western.

Lesser Whitethroat (*Sylvia curruca*) extends into Wales, but is rare there, showing that this is an outlying station. It is unnecessary to multiply examples further, for the same laws will be found to be more or less strictly applicable to all the regular summer migrants of Great Britain unknown as such in Ireland.

Now, it has been already shown that in the districts lying east and west of the area included within the normal migratory lines of each species, there occur subareas which are nearly as suitable for the well-being of such species as the districts contained within these limits; and hence, if by any disturbing cause a migratory bird is driven out of its usual course, it may in such subareas find a spot in which it can subsist, and where it will probably remain until more favoring circumstances enable it to regain its course, and if this divergence takes place during its northernly migration it may possibly breed here.

Remarkable instances of these latter phenomena are seen in Ireland among southern migrants; in the golden oriole (*Oriolus garrula*), blackcap warbler (*Sylvia atricapilla*), hawfinch (*Fringilla coccothraustes*), crossbill (*Loxia curvirostris*), rose pastor (*Pastor roseus*), hoopoe (*Upupa epops*), melodious willow wren (*Sylvia trochilus*), stone curlew (*Œdicnemus crepitans*), dotterell (*Charadrius morinellus*), and possibly in the grasshopper warbler (*Sylvia locustella*); and in Great Britain, in the golden oriole, hoopoe and rose pastor, &c.

Taken it as proven, that migration takes place in a line north and south, that it has fixed longitudinal limits, and that through disturbing causes species occasionally transgress these limits and survive, the occurrence of summer European migrants in these isles is what might have been expected,— all that has occurred is this, — the birds in their passage south meeting with easterly gales have been driven from their course, and, finding here localities suited to their habits, remain either till spring or till a favorable moment for continuing their southern journey arises.

The instances of the occurrence of such birds in Ireland in winter

are more numerous than might be supposed from published records. I have collected all I could come across, either from my own researches, from those of R. J. Montgomery, Esq., jun., of Ballina, kindly communicated to me by that gentleman and from Thompson's 'Fauna of Ireland,' and have little doubt that they do not represent a tithe of the instances in which this has occurred. We may divide them into — 1st, regular British summer migrants, unknown as such in Ireland, though one or two have occurred during this season here; 2nd, Irish summer migrants; and 3rd, European summer migrants, only irregular visitants to the Britannic area.

1st. British summer migrants :—

Reed Wren (*Sylvia arundinacea*). Dublin, December, 1843.

Redstart (*Sylvia phœnicurus*). Dublin, 1828 and 1830; Queen's Co., 1847; Belfast.

Blackcap (*Sylvia atricapilla*). Belfast, 1834; Dublin, 1833, 1843, 1846, 1847. This bird occurred in Phœnix Park in the summer of 1844, and has bred in the county of Dublin and elsewhere many times; Tipperary, 1834; Waterford, 1830, 1834 and 1858; Galway, 1842; Cork, 1839. This species is recorded as having occurred in England several times in winter.

Stone Curlew (*Œdicnemus crepitans*). Dublin, 1829 and 1849; Waterford, 1840; Kerry, August, 1842; Wexford, 1844.

Dotterell (*Charadrius morinellus*), breeds in Ireland rarely. Down, 1834; Tipperary, 1853.

Spotted Crake (*Gallinula porzana*). Occasional in summer. Belfast, 1835, 1847 and 1848; Donegal and Down, 1828 and 1848; Dublin, 1835; Wicklow, 1835; Queen's Co., 1834; Kerry, 1845 and 1846; Clare, 1832; Waterford, 1842 and 1843.

Ruff (*Machetes pugnax*). Nearly regularly every winter. Antrim; Donegal, 1837 and 1838; occasionally in Dublin; Wicklow, 1853; Kildare, 1838 and 1840; Tipperary, 1848.

2nd. Irish summer migrants :—

Ring Ouzel (*Turdus torquatus*). Dublin, 1842 or 1843, 1847 and 1848.

Whinchat (*Sylvia rubetra*). Dublin, 1847, 1848, 1850 and 1859.

Sedge Warbler (*Sylvia Phragmites*). Dublin, 1842.

Whitethroat (*Sylvia cinerea*). Dublin, 1843.

Chiffchaff (*Sylvia rufa*). Louth, 1849; Castle Warren, Co. Cork, November, 1850 to February, 1851.

Common Swallow (*Hirundo rustica*). Louth, December, 1850; Castle Warren, Co. Cork, 1849. It is a question whether the birds of this species and the sand martins (*Hirundo riparia*), seen sometimes late into the autumn and winter, do not fall under this category rather than under that of birds which have overstaid their time here. I have seen the former species about Dublin late in November in several years (the past one among the number), and have always remarked that when this occurred there was an interval during which no swallows at all were visible, and then the species reappeared. G. H. Kinahan, Esq., sends me a note of the occurrence of the sand martin at Castle Connell, Co. Limerick, November 30th, 1859.

3rd. European summer migrants, occurring in winter in the Britannic area:—

Great Gray Shrike (*Lanius excubitor*). Northumberland and Cumberland, Durham, Cheshire, Worcester, Norfolk, Cambridgeshire, Suffolk, Hertford, Surrey, Kent, Sussex and Devon. On two occasions it has bred in England. The species is noted in Norway, Sweden, Denmark, Lapland and Russia. South; in Germany, Holland (rare), France, Spain and Fezzan. In Ireland the species has occurred in Antrim, 1834 and 1835; Down, 1845; Londonderry, 1846; Sligo, 1831 or 1832; Westmeath and Dublin, 1822 or 1823, 1831 and 1850; Queen's Co., 1847; Tipperary, Waterford and Cork, 1824, 1844 and 1845.

Black Redstart (*Sylvia tithys*). Kirkwall, Orkney ('Field' newspaper, 1860); Derby, 1856; Norfolk, 1849; Oxford, 1852; Gloucester, 1830 and 1835; Middlesex, 1829; Hants, 1842, 1849 and 1852; Sussex, 1830, 1839, 1843, 1849, 1850, 1851, 1852 and 1853; Devon, 1833, 1843, 1847, 1849 and 1850; Kent and Cornwall, 1842, 1843, 1844, 1849, 1853 and 1856. Mr. Edward Hearle Rodd states it is a regular winter visitant to Cornwall. Its range is Sweden (scarce), Germany, France and Holland (rare), Spain (a winter visitant), Provence and Italy (where it resides in winter), Cape Sicily, Malta and Tangier; it is also recorded from the Morea and Smyrna; and Assistant-Surgeon, William Carte, has brought it from the Crimea. In Ireland the species has occurred in Antrim, 1841; Dublin, 1859; Wexford, 1836; Waterford, 1828, 1829 and 1843; Cork, 1845. The parallelism between these species as to distribution and occurrence is striking, and the necessary connection between the causes of it scarcely needs comment.

These remarks have already run to such a length, that I must omit

the many examples which might be quoted from the other groups of birds falling under the same categories, for these have sufficiently proven that the explanation given is correct. Confirmation of the same thing is also seen if examination be made into other facts relating to distribution; for instance, we find that of the group of birds which are resident in Great Britain, non-resident, yet occasional visitants to Ireland, all are migratory in some parts of the European continent and have occurred in Ireland in the winter; as examples may be cited, — the kite (*Falco milvus*) and the great spotted woodpecker (*Picus major*), Antrim, 1839 and 1849; Londonderry, 1802; Armagh, 1845; Dublin, 1831 and 1850; Carlow, 1845; Tipperary, 1831 and 1849; Sligo, 1835 and 1850; in two cases only have these birds occurred here (viz., May and August) in other than the winter months. It is remarkable also that all the southern species which have only occurred once or twice in this country have done so in winter, — the spotted eagle (*Falco nævius*), griffon vulture (*Vultur fulvus*), White's thrush (*Turdus Whitei*), crested lark (*Alauda cristata*), two-barred crossbill (*Loxia bifasciata*), &c. Northern stragglers occurring here, as the eagle owl (*Strix bubo*), snowy owl (*Strix nyctea*) and Bohemian waxwing (*Bombycilla garrula*), have been long ago recognized as birds driven from their migratory course, and an error has been committed in not making a more general application of the same law in all cases of accidental visitants,— an error the more surprising as some of our authorities, as for instance William Thompson have recognized that such is the case in regard to many species, as the woodpecker, quoted above.

I have little doubt that to the same principles we must look for the explanation of the fact, that the occurrence of Australian, American and African birds, such as the great spotted cuckoo (*Cuculus glandarius*), yellowbilled cuckoo (*Cuculus americanus*), belted kingfisher (*Alcedo alcyon*), Egyptian goose (*Anser ægyptiacus*), and soft-billed duck (*Anas membranaceus*), have mostly occurred in the winter.

I must apologize for the length to which these remarks have run, but that they were called for is sufficiently shown by the constant remarks of wonderment met with in authors, as to the absence, in Irish and Scotch lists, of species met with in England and also occurring much further north. I hope to return to the subject at some future time, and will now conclude by calling attention to the fact that, by examination of the few dates given, it will be seen that these accidental occurrences of species have occurred nearly in

the same years, showing that the same causes have caused divergence from the usual routes in almost every case.

JOHN ROBERT KINHAHAN.

A List of the Birds of Banffshire, accompanied with Anecdotes.

By THOMAS EDWARD.

(Concluded from page 6849.)

Curlew Sandpiper (*Tringa subarquata*). I have only met with one specimen of which I can speak with certainty; this was in September, 1852.

Knot (*T. canutus*). A few generally visit us every autumn on their southward passage. They are remarkably easy of approach.

Little Stint (*T. minuta*). A very fine little fellow. I once had a desperate hunt after one. Returning home one evening along our links, I heard a strange cry, coming, as it seemed, from the shore. I listened for some time, as I knew it was the season (September) for many of our migratory species visiting us. Never having heard the cry before, I was speedily on the beach. But it was dark, and I had not cat's eyes; the sound, too, ceased as soon as I gained the beach. After groping about for some time I thought I espied a rather large flock of birds at some distance along the shore. I approached cautiously, and found that I was correct, the flock consisting chiefly of ringed plovers, dunlins and sanderlings. From the latter circumstance, and from the fact that the cry was that of a sandpiper, I was pretty sure that a stranger was amongst them. Although I could see well enough that the birds were on the wet sand between me and the water, I could not make them all out distinctly. Once or twice I thought I could distinguish one considerably smaller than the others, but directly felt that I had been mistaken. I was now in a state of great excitement; every limb shook like an aspen leaf, or a cock's tail on a windy day. What was I to do? True I might have fired at them, but the odds were greatly against my being successful. It was now fairly dark, and the birds had retired to rest on a ridge of shingle which intervenes between the sands and links. Instead of returning home, as any one else would have done, I laid in a hollow till morning, to await their first appearance, in the hope of attaining

my object. * It proved a wet and windy night, but daylight brought with it a fine morning; with it also came two gunners along the beach. This vexed me to the very heart. The birds were not yet astir, but I knew they would rise at the approach of the men, who would doubtless attempt to shoot them. Just as I anticipated, up went the birds, crack, crack went the shots, and down fell several birds. Rising from my stony couch, I rushed at once to the spot to see the victims, and found them all to consist of sanderlings, dunlins and one ringed plover. The gunners were strangers to me, but I ventured to ask them to abstain from firing until I had satisfied myself about the bird I sought; but they seemed unable to understand why one bird could be of so much more interest than another, and told me that, as there were plenty of them, I could fire away, and take my chance. I declined to shoot with them, but eagerly watched each time they fired, and if a bird fell I went and examined it, but did not meet with the one I sought. They at last got tired, and went away. It was now my turn; but unhappily the birds, from being so often fired at, had become extremely shy, so that to near them sufficiently for my purpose was all but impossible. By perseverance, however, I at length again made out one, as I thought, a good deal smaller than the others. I succeeded in creeping a little nearer. They rose, I fired, and down fell four. I rushed, breathless, hoping to pick up the bird in which I took such interest. But alas! no: it was not

* As the writer of this List is doubtless unknown to the majority of the readers of the 'Zoologist,' and as some of them might in consequence be inclined to think this an exaggeration, it may be as well to state that at one period of his life such proceedings were quite common with him. Four successive seasons he was never in his bed for about five months of each year, except on Saturday and Sunday nights, and when the weather was very stormy. His day's work done, with his gun upon his shoulder, his insect-box and appendages slung on his back, his plant-case by his side, and with a host of pill-boxes, small bottles, &c., to meet emergencies, away he bounded, with heart as light as a feather, either to the woods, fields or sea-shore, searching, as long as any daylight remained, for specimens in Natural History. Daylight gone, he would lie down for a nap; no matter whether by the side of a rock, a sand-bank, a hole amongst the shingle, in a ditch, under the cover of a bush, behind a dyke, or by the side of a tree, it was all one. There he lay till the first peep of morning, when he was at it again, and continued until he thought he had just sufficient time left to get to his work by the appointed hour; this, however, only when nothing new or rare attracted his notice, for in that case neither work nor home ever once crossed his mind until the object of his pursuit was either procured or entirely out of reach. During a tour between Banff and Aberdeen coastwise, which occupied six days, he rested only one night in bed, sleeping the remaining five by the way-side and amongst the bents by the sea-shore.

there. And away went the remainder towards the sea; then, turning, they rounded a point or headland called Blackpots, and disappeared from view. From this and their not returning I knew that they had gone to the sands at Whitehills, about three miles distant, to which place I proceeded; but no sooner was I there than back they flew in the direction they had come. Back I went also, and found them at the old place. Just as I reached them away they went once more, and of course away I went likewise. In this way we continued nearly the whole day, they flying to and fro, I following them. Towards evening, my strength beginning to fail, and feeling quite exhausted, I gave up the chase, and once more took up my abode amongst the shingle, in the hope that they might return there again for the night. Just as I wished and expected, and while it was yet light, they came and alighted about thirty yards from where I lay. Away went fatigue, hunger, and thoughts of home; in fact, the sight of the object of my day and night's solicitude made me a new creature. Off went the messengers of death. Two of the birds fell, the rest fled once more towards the sea. I followed, but had not proceeded far when I observed one falter; leaving its companions, it bent its course towards where I stood, and suddenly dropped almost at my very feet. As I picked up the little thing I could not but feel thankful that my patience and perseverance had been crowned with such success. It was the first little stint I had shot, and the only one I have ever seen here.

Temminck's Stint (*T. Temminckii*). Mr. Taylor, at one time gamekeeper to the Earl of Fife, is said to have shot a specimen on the river bank.

Dunlin (*T. variabilis*). These breed in a few of our marshy places, and may now and then be met with along the coast. Towards autumn large flocks appear, but do not remain long. Specimens may be picked up occasionally, during winter, almost pure white, except the bill, legs and feet, which retain their usual colour. This species appears to differ considerably in size, the legs and bills included, the larger birds often having the shortest bills.

Purple Sandpiper (*T. maritima*). A rock-loving species whilst with us, never leaving the rocks unless from necessity. They are gregarious, and huddle so closely together that I have known as many as twenty-three killed at one shot. I have killed them occasionally during summer, their colour then being of a rufous or rusty character, or more like that of the dunlin, the purple gloss and dark gray plumage of winter having all but disappeared.

Land Rail (*Gallinula crex*), "corn craig" or "crake" with us. Very sparingly distributed here. It arrives generally at the beginning of May, and departs usually in September, but I have seen it as late as December. These birds often feign themselves dead, when hard pressed, rather than fly,—a fact that may seem incredible to those who have paid no attention to such things. I was myself once completely baffled by a pair. Knowing they were in a small hay-field close by, I wished to obtain them, but being unable to raise them myself I got the assistance of a man and a dog. First the dog was sent, but it did not make them fly; we then went in ourselves, with a like result, but quite satisfied that they were still in the field. In this we were correct, for we had not long left the field when both commenced their "craik" again. At that time I was not aware of their power of dissembling. On another occasion I shot one while it was crying, and without seeing the bird. When shot it leaped about, like a rabbit will sometimes when hit. I rushed to the spot, and found it lying to all appearance dead. I picked it up, and was gratified at finding it an excellent specimen, in first-rate plumage, and its appearance very little injured by the shot; in fact, it was just such a specimen that I was in want of. The tip of one of the wings was broken, and that was all. Leaving the field, and bringing with me the bird, I sat down a little distance off. Having put a piece of cotton wadding down its throat and some rum to the wound, I laid it carefully down beside my gun. I had only sat a few minutes when a gentleman who was passing asked me what I had shot. I told him. "I am glad of that," said he, "for I have never seen one, although I have often heard them when out walking in summer." "Oh, well," I said, "you shall see as pretty a one as eyes ever beheld," at the same time turning round with something like energy to where the (as I thought) dead bird lay, in order to show it to the gentleman. Need I tell the sequel? "It's awa', sir." "What!" said the gentleman, "away?" "Then, it could not have been dead, as you led me to believe." "It's awa', sir," I again said; "an' fat's mair, I can assure ye it wis dead. I shot it dead; but, confound it, it's awa' for a' that, cotton wadding an' a'!" Yes, it was fairly off, and I was tricked; there is no doubt of that. Is it possible that these birds remove their eggs on its coming to their knowledge that their nests have been discovered? I knew of a nest which contained seven eggs. I took one, and, wishing to get all that the hen would lay, left the remainder untouched; I also carefully obliterated all my footmarks, to prevent others from suspecting anything if the nest was

found. I went back three days afterwards, when, although there were no signs of human foot-prints, all the eggs were gone. A nearly black specimen was killed by a dog near here, some years ago; also one with only one leg, and but one fore toe to the remaining foot.

Little Crake (*G. pusilla*). Only one of this British rarity has been procured here, as far as I know. This occurred in March, 1852, at a place called Thornton, on the banks of the Isla. It was found dead by a girl tending cattle.

Moorhen (*G. chloropus*), or, as we have it here the "waterhen," for if any one were to speak here of the moorhen he would be looked upon as talking of the red grouse or "muir fowl." In consequence of having but few lochs, and those very small, we have not many of this species. A few about our rivers, and what little pieces of water we have, are all we can boast of.. They are excellent swimmers, although not web-footed; nor are they bad divers; and as skulkers they almost rival the land rail.

Water Rail (*Rallus aquaticus*). Far more scarce than the last, in fact it is almost a rarity. Specimens are now and then met with, and that is all. Perhaps their skulking habits prevent their being oftener seen.

Coot (*Fulica atra*). I believe this to be but an occasional visitor. A few specimens have been observed at different times. On the loch of Strathbeg (Aberdeenshire), where they are pretty numerous, they breed, and remain all the year round. In very wet summers the water of this loch rises at times considerably above the usual level; on such occasions I have seen the coot sailing nobly along with her nest beneath her.

Gray Phalarope (*Phalaropus platyrhynchus*). Three specimens were procured on the sands of Sandend, during the winter of 1840—1.

Rednecked Phalarope (*P. hyperboreus*). One specimen, a male, was shot on the beach here, in the spring of 1855.

Of the genus Anser we are remarkably scanty. Several kinds of geese have from time to time been procured, and not an autumn or spring passes without many large flocks being seen passing and repassing, but to what species they may belong it is difficult to say. That the graylag (*Anser ferus*), the brent (*A. bernicla*), the Egyptian (*A. ægyptiacus*), and the spurwinged (*A. gambensis*) have been met with is beyond doubt; but that these are all that have visited us it is hard to say. The brent is very numerous some seasons along the coast.

The genus Cygnus is still more scantily represented. Some of

them visit us in passing to and from their breeding grounds; but I am not aware of any ever having been obtained.

Common Shieldrake (*Anas tadorna*). This pretty bird is only a winter visitor with us, and then not in large numbers.

Shoveller (*A. clypeata*). This pretty bird is quite a rarity here. In the latter part of the winter of 1837—8, which was of great severity here, a mutilated specimen of the shoveller was found dead amongst the rocks at Blackpots. This, a male in splendid plumage, is the only one I have seen or heard of here.

Gadwall (*A. strepera*). Another great rarity, so far as I am aware; one, a female, procured in the Diveron, by Dr. Leslie, about the time the shoveller above alluded to was picked up, is the only one I know of.

Pintail Duck (*A. acuta*). I remember being aroused rather early one morning, many years ago, by a loud knocking at the street door, and a person calling out at the top of his voice, "Rise, man! rise! I've brought a rare bird t' ye—a duke!" Being awake I immediately jumped up; but had I been sound asleep I believe the words "rare bird" would have awoke me. On seeing the bird I was delighted at beholding a beautiful male pintail. It had been shot the night before, on the Diveron. They have, I believe, been seen on the Spey also.

Wild Duck (*A. boschas*). Plentiful, especially in winter. Among the sandy bents almost close to the ocean's verge, and on the tops of our heath-clad hills and moors, I have found this species breeding; also on a tree about thirteen feet from the ground, and on a rock in the craigs of Alvah. This latter nest was placed on a ledge fully thirty feet above the water, and had eight or nine feet of perpendicular rock above it. There is a hill near here which I believe they used frequently to nestle on, but which they have now quite deserted,—a hill to which I have already alluded,—viz., Fern or Whin Hill, better known as Gallow Hill. It was on this hill, or rather piece of ground, for it hardly deserves the name of hill, that the celebrated freebooter M'Pherson finished his earthly career. It is a rough and stony place where he lies, covered with heath and whin. The pheasant and wild duck used not unfrequently to breed on his very grave. On a small island on the Diveron stood a tall old poplar. About five feet from the ground it divided into two arms, one stretching upwards, whilst the other bent over the river, and it is with this one that we are most concerned. In 1839 the Diveron, like the other rivers in Scotland, rose far above its usual height, so high indeed that it

reached the arm of the tree alluded to, on which it deposited a good deal of rubbish. A female wild duck built her nest, a few years afterwards, amongst the *débris* thus left, and succeeded in rearing a brood of thirteen young ones. Neither nest nor bird, though known of by some salmon-fishers who had a station close by, were disturbed. One morning the female was observed by these men to leave her nest and fly up and down the water in an unusual manner. Presently she was joined by the male, and both disappeared beneath a bank a little above where the nest was. The fishermen, who had watched them, observed the female reappear alone, and, after flying up and down once or twice, again settled down on the water, just below the tree which contained the nest. After sailing about for a few minutes, she was heard to give a "quack," when down went something into the water, and presently a young one was seen by her side. Away she swam with it to the bank referred to, consigning it to the charge of the male; after which she returned, and, having again sailed about for a short time, gave another "quack," when down came another youngster, which she also led away to the bank. In this way she continued until all were safely removed, never giving more than one "quack," and never carrying more than one young one at a time; nor did she return after taking away the thirteenth.

Garganey (*A. querquedula*). Two specimens of this species were shot in December, 1840; and one is said to have been obtained at Cullen, in the spring of 1841.

Teal (*A. crecca*). Occasionally met with in winter.

Wigeon (*A. Penelope*). One of our rarest duck visitors. A splendid male specimen was killed by H. A. Rannie, Esq., of Boyndie, near his residence, in September, 1853.

American Wigeon (*A. americana*). A mutilated male specimen of this rare duck, shot on the Burn of Boyndie, in January, 1841, was for many years in my possession.

Scaup Duck (*A. marila*). Pretty frequent during winter.

Tufted Duck (*A. fuligula*). Very rare.

Goldeneye (*A. clangula*). A regular winter visitor, generally coastwise, but they are also met with on mill-dams many miles inland.

Longtailed Duck (*A. glacialis*). Abundant, but always keeping near the coast. I have shot them when in their full breeding dress, which gives them quite a different appearance. In spring they are very clamorous, pursuing each other through the water, and diving and skipping about like Merry Andrews. The noise they make on such occasions is so loud that I have heard it, on a still morning,

nearly three miles distant. They are generally among the first to arrive and the last to leave.

Hooded Merganser (*Mergus cucullatus*). I was told by an old gunner and bird-stuffer that he had shot a specimen of this species, but I cannot vouch for the accuracy of the statement.

Redbreasted Merganser (*M. serrator*). Not very plentiful. All along the coast, in suitable localities, they may be met with, singly and two or three together, never more.

Goosander (*M. merganser*). A winter visitor. The male is a very showy gentlemen. As many as seven or eight specimens were procured at one shot, on the Diveron, by a Mr. Gellie. I have seen as many as five or six together, not more.

Great Crested Grebe (*Podiceps cristatus*). An occasional visitor.

Rednecked Grebe (*P. rubricollis*). Of more frequent occurrence, but generally in immature plumage.

Eared Grebe (*P. auritus*). Less frequent than the last.

Little Grebe (*P. minor*). A winter seldom passes without an opportunity occurring to obtain this species. I think it is one of the most expert divers we have.

Great Northern Diver (*Colymbus glacialis*). Some seasons pretty plentiful. Splendid specimens are at times procured, but they are generally immature.

Blackthroated Diver (*C. arcticus*) and Redthroated Diver (*C. septentrionalis*). Winter visitors, and, as far as I am aware, in about equal numbers. A few of them generally fall victims every spring by getting entangled in the bog-nets set for salmon. They not unfrequently visit our larger streams, where they make great havoc among the smaller of the finny tribe.

Brunnich's Guillemot (*Uria Brunnichii*) has been once met with.

Common Guillemot (*U. troile*), Ringed Guillemot (*U. lachrymans*), Black Guillemot (*U. grylle*), Puffin (*Mormon fratercula*), and Razorbill (*Alca torda*). All these species breed with us, but the common guillemot only rarely. As my late respected friend the Rev. Mr. Smith has already given (Zool. 2905) an account of the breeding-places of the Banffshire birds, I need only state that since that account was written the ringed guillemot has been discovered to breed here. I resolved to visit the rocks of Gamrie, to ascertain if the species nested there, but although I spent nearly two days in searching I failed to detect it. Sailing in a little bark, with a gentle breeze blowing, I had ample opportunity of viewing the various birds as they were approached and as they flew past. Passing in

front of the several sea-fowl nurseries of Troup, I beheld scenes truly magnificent,—scenes which could not have failed to create feelings of the deepest interest, in a mind capable of appreciating the sublime and beautiful workings of Nature. Having landed at the most famed of these nurseries, in order to view the scene with advantage,—here, I thought, as I gazed at the white towering cliffs, which had laughed to scorn the angriest scowl of the most mighty wave that ever spent its fury against their base, and defied the stormiest blast from the icy North; where the largest gull in its mid-way flight appears no larger than the smallest of its kind; where the falcon breeds beside and in perfect harmony with the other inhabitants of the rocky cliffs; where multitudes of birds, of various forms and hues, from the snowy whiteness of the kittiwake to the sable dye of the croaking raven, have found a resting-place whereon to build their nests and deposit their eggs,—here, I thought, as I was about to leave the busy throng, even here, man, the noblest, although too often degrading himself far beneath the lowest of all animals, might learn lessons of industry and affection from these humble monitors of Nature. Though thus unsuccessful myself, I had only returned home a day when I had the pleasure of having one sent me by a friend whom I had asked to keep a look-out for it. I have procured several since, both in winter and summer; I have also been shown places in the cliffs where the fishermen say they know them now to breed.

Little Auk (*Alca alle*). A winter visitor. In December, 1846, a terrific sea-storm raged here for the greater part of the month; at its termination I counted between the Burn of Boyne and Greenside of Gamrie, a distance of about nine miles, nearly sixty of these little birds lying dead, besides a number of guillemots and razorbills. Great numbers were also found dead in the fields throughout the county. It is a grand sight to see one of these diminutive but intrepid creatures manœuvring with the impetuous billows of a stormy sea. Wave follows wave in rapid succession, bearing destruction to everything within reach; but the little auk, by Nature taught, avoids the threatened danger, either by mounting above the waves or by going between them, reappearing unhurt as they spend their fury on the unoffending shore. It has disappeared, and is nowhere to be seen. The eye wanders in vain amongst the turbulent surge, to catch another sight of the little sailor bird; and one unacquainted with such a scene would be apt to exclaim, "Poor little thing, it is killed, and buried amongst the foam." Patience, my friend, I would say. Look again. See, it is there once more, as lively as ever, and

ready to master the next billow. It had but descended in search of food.

Cormorant (*Carbo cormoranus*). Frequent, except a short time during summer. A pair or two may breed with us, but that is all. Like the divers they destroy great numbers of fish.

Shag (*C. cristatus*). Only, I believe, an occasional visitor.

Gannet (*Sula bassana*). A spring and autumn visitor, and occasionally during summer and winter. When overtaken, as they sometimes are, by strong north winds from the sea-shore, I have known them driven to great distances inland, where they are frequently seen lying dead. Immature specimens are now and then procured during their autumnal passage, and from their different plumage are looked upon as distinct from the "solan goose," as the gannet is here called.

Sandwich Tern (*Sterna cantiaca*). An occasional visitor, generally in summer.

Roseate Tern (*S. Dougallii*). Two specimens have been obtained between Banff and Cullen.

Common Tern (*S. Hirundo*) and Arctic Tern (*S. arctica*). Annual visitors, generally in the autumn, some seasons in immense numbers. Although they do not breed with us, they do so on part of the sandy shores, &c., of the adjoining counties of Aberdeen and Moray.

Lesser Tern (*S. minuta*). This pretty little lady-like bird does not breed with us, but does so in the places mentioned for the two preceding. It is only an occasional visitor. About fifty years ago a specimen was shot on our links by an old gunner of this town. The bird being a stranger to him he carefully brought it to town to make inquiries. Ornithology, or in fact Natural History, was at that time, at least here, scarcely heard of; ministers, medical men and schoolmasters being the only persons at all acquainted with the subject. The bird was seen and admired by a great number of people, but no one had seen anything like it before. The minister was appealed to, but he could not say what it was. A medical man said to be learned in these things was then visited. Having put on his spectacles, after looking again and again at the bird he turned to its captor and exclaimed, "What do you say, sir,—this bird killed on our links?" "Yes, sir." "Killed in this country, on our links? Why, man, I can hardly believe you. It's not a bird of this country at all; it's a foreigner. I tell you it's a foreigner, and could not have been shot here." "Foreigner or no foreigner," said the captor, somewhat displeased, and taking up his bird, "it was killed at the sea-side here, say what you like."

Black Tern (*S. nigra*). I know only one instance of its having occurred here.

Sabine's Gull (*Larus Sabini*). I had an exciting chase after a specimen, but failed in capturing it; it was the only one I have seen or heard of here.

Little Gull (*L. minutus*). I believe only two specimens have been met with.

Masked Gull (*L. capistratus*). I am informed that two of these birds were killed about thirty years ago.

Blackheaded Gull (*L. ridibundus*). Like the common and arctic terns, this species, although it has no breeding-grounds with us, breeds on either side in great numbers, and is a frequent visitor here, chiefly in spring and autumn.

Kittiwake (*L. tridactylus*). Breeds with us, but not in such numbers as formerly.

Ivory Gull (*L. eburneus*). A female specimen, shot near here, January 29, 1847, is the only one I am aware of.

Common Gull (*L. canus*). Abundant during winter and spring, and parties may be met with all the year round. I believe it does not breed with us.

Iceland Gull (*L. leucopterus*). Sometimes, during winter, a specimen of this northern bird may be obtained, but mostly in an immature state of plumage.

Lesser Blackbacked Gull (*L. fuscus*). Met with now and then, but not in great plenty. It does not nestle here.

Herring Gull (*S. argentatus*). Breeds at Gamrie Head and at Traup. Numbers are taken when young by the fishermen and their children, and brought up quite tame, walking about the villages like poultry.

Great Blackbacked Gull (*L. marinus*). Like his lesser brethren, this gentleman is but a visitor here, and generally before he gets his black coat.

Glaucous Gull (*L. glaucus*). A female, in an immature state of plumage, was killed at Gamrie.

Common Skua (*Lestris catarractes*) and Richardson's Skua (*L. Richardsoni*). Both are to be met with as visitors, the latter the rarer of the two.

Fulmar Petrel (*Procellaria glacialis*). An occasional winter visitor. I had a specimen sent me from Gamrie which approached a boat so closely that one of the fishermen knocked it down with an oar; this was several miles out at sea.

Great Shearwater (*Puffinus major*) and Dusky Shearwater (*P. obscurus*). Only winter visitors.

Storm Petrel (*Thalassidroma pelagica*). A visitor, like the rest of its kindred, but more frequent, and may be met with at intervals all the year round. The superstitious dread of this little bird by sailors and fishermen is well known.

With the storm petrel ends my List of the Birds of Banffshire. Many species given as "rare" may turn out to be of frequent occurrence, and many given as "occasional visitors" may prove to be natives. Species, too, not mentioned in this List may have to be included in the birds of the county; and no one will be more pleased to hear of such additions than myself.

THOMAS EDWARD.

Note on the Barn Swallow of Jamaica (Hirundo americana).—I observe that [the late lamented] Mr. Osburn, in his Jamaica notes, (Zool. 6878) refers to a "seventh species of Hirundine," which he says "might easily be taken for the English bird, H. rustica, but it is, I think, ruddier beneath, and has on the outer vane of each tail-feather a conspicuous white oval spot. It may possibly prove to be the American barn swallow. That the bird so imperfectly described is the Hirundo americana I have little doubt, but then the white spots would be on the inner webs of each tail-feather, excepting the two middle ones, as in our chimney swallow, which I have remarked in my Canada notes, that it greatly resembles (Zool. 6705). "Its tail (Hirundo americana) is forked; and this bird, in shape, colour and manner of flight, bears so strong a resemblance to the chimney swallow of Europe, that even an ornithologist might be excused for mistaking it on the wing." Possibly the above may be a misprint, for the following note by Mr. Gosse, instead of clearing up the point, leaves it more obscure than ever. He remarks: "Or H. fulva, perhaps, but neither of these species has any white on the inner vanes of the tail-feathers." Having shot and closely examined more than one barn swallow — which are now on the table before me—I can answer for the correctness of Wilson's description (see vol. ii. p. 43):—"The barn swallow of the United States has hitherto been considered by many writers as the same with the common chimney swallow of Europe. They differ, however, considerably in colour, as well as in habits, &c." But even Macgillivray seems to have been impressed with the idea of their being the same; for he observes (vol. iii. p. 572):—"If this species be identical with the American bird bearing the same name, as it appears to be, although several ornithologists have considered it different, &c." I am one of the nonconformists; for of its being a distinct species I have not a shadow of doubt; for not only does it differ materially in colour, but in size and habits. Never building in chimneys, it cannot, with propriety, be named the chimney swallow. As I have not a skin of Hirundo fulva to refer to, I must quote Wilson and Bonaparte's Ornithology, in refutation of Mr. Gosse's notion that it may be a bird of this species that has been remarked on by Mr. Osburn (vol. iv. p. 79:)—

"The exterior tail-feather is slightly edged with whitish on the inner vane." "The most striking characteristic of Hirundo fulva is its even tail." Yet Mr. Gosse says, that "perhaps" the "long fork-tailed" swallow, noticed by his ornithological friend, may be the Hirundo fulva. Moreover, the latter is but "five and a half inches long," whereas the male of Hirundo americana — according to my notes — measures seven inches and two-tenths in length, and thirteen inches in extent of wings. But even the "pale rufous ash-colour of the breast," not to mention the "whitish under parts" of the Hirundo fulva, might have convinced Mr. Gosse that this could not possibly be the "seventh species of Hirundine," observed by his Jamaica correspondent.— *Henry Hudfield; Ventnor, Isle of Wight, March* 8, 1860.

Note on the Piramidigs of Jamaica (*Chordeiles*).—The peculiarity of flight in the piramidig, remarked on by Mr. Osburn, is very similar to what I had observed in the Caprimulgus americanus (Zool. 5803): — "It was about half-past four o'clock, p.m., when my attention was first directed to a flight of these most elegant birds; and a more beautiful sight, at least for an ornithologist, could not well be desired; for some forty or fifty were to be seen within a very narrow circle hawking flies; and their manner of doing so, as well as their rapidity of flight,—in the distance so similar to that of the swallow, — at first inclined me to believe that it was a flock of swifts approaching, but I was soon undeceived. They were now to be seen passing over-head at the distance of thirty or forty yards. Their flight was circular, but they were constantly deviating from this order of progression by momentary and sudden darts after the flies; often, when descending, raising the wings so as to bring the points nearly together, after the manner of the pigeon tribe. Their flight was most buoyant, and occasionally bat-like, &c."— *Id.*

Sun Bird: correction of an error. — I was in North America when my Indian notes were published, or I might have replied to the editorial remark on my notice of the Indian humming bird (Zool. 5797), which I had therein erroneously named the Mango humming bird; but from the prefatory remarks, &c., it might have been gathered that my acquaintance with the birds of the Carnatic was but slight. Having consulted an old work, I found the Mango humming bird mentioned as a native of the Indies, *i. e.* West Indies. However, there can be no doubt it was the beautiful little sun bird that I so frequently observed — more than thirty years ago — hovering over the flowering shrubs in my garden at Trichinopoly, and which, to my unpractised eye, seemingly possessed all the characteristic features of the true humming bird. I also observe that the Rev. J. C. Atkinson, in a note appended to his paper on "Reason and Instinct," seems to demur to my construction (Zool. 5648) or interpretation of his statement. He pointedly refers to Montagu's Dictionary, *i. e.* Ornithology, but ignores Temminck and the other authors quoted; though their evidence directly tends to prove that the inspired writer's "words *are* characterized by precision and scientific accuracy," and not mere "allusions and references," as asserted. By consulting the Dictionary, not Montagu's, it will be found that "yea," in the sense used by Jeremiah, means — *it is so.* Here is no want of "precision." Then follows the expression —"Knoweth her appointed times," but this likewise, I am to be told is a mere "allusion." Finally, there is the information, that they "observe the time of their coming," *i. e.* obey an instinctive law of Nature; a knowledge of which, is surely a proof of "Science." Had the remarks of the reverend author been merely personal, they might have remained

unnoticed, but I would not have it even appear that the inspired writer had "no information" on the subject.—*Id.*

Occurrence of the Goatsucker (Caprimulgus europæus).—On February 19th, when walking on the public road near Steep Hill, I was surprised at seeing a bird of this species fly past me.—*Id.*

Birds observed between New York and Glasgow :—

Great Tern (*Sterna Hirundo*). May 29th. On leaving the harbour of New York, observed some terns, belonging, I think, to this species; also a few gulls, but they were not identified.

Wilson's Storm Petrel (*Thalassidroma Wilsoni*). Numbers of these birds were seen, and they continued with us till we reached the longitude of Cape Race, when they gradually disappeared. Though several lines had been suspended at the stern with a view of entangling them, none were secured. They frequently approached within a few yards of the steamer, so that the different shades of the plumage could be observed; the wings are tinged and spotted with reddish brown. The tail appears slightly forked, or rather doubly emarginate, in consequence of the outstretched legs protruding considerably beyond it; and which might possibly lead a casual observer—who had never before seen them on the wing — to mistake them for the fork tailed petrel. On any refuse being thrown overboard they invariably gathered round it, but rarely settling on the water for more than a few seconds at a time, and then with upraised wings.

Skua Pirate Bird (*Lestris catarractes*). Saw what I believe to have been birds of this species, also a few gulls. On getting to the eastward of Newfoundland the former disappeared.

Guillemot (*Uria troile*). When about a hundred and fifty miles to the southward of the Cape, numerous flocks of guillemots frequently passed within a few yards of the ship, apparently unconscious of danger. St. John's appears to be one of their chief breeding places, vast numbers of their eggs being found scattered on the rocky and stony declivities of the head-lands of this bold coast; I saw bushels exposed for sale in July, 1857.

Parasitic Skua (*Lestris parasitica*). On the 6th of June, when some degrees to the eastward of Newfoundland, and about half the passage had been accomplished, observed a white skua, belonging, I have no doubt, to this species. After hovering over the ship it alighted on the mast-head. On the 7th, five more were seen following the course of the steamer, but often at such an altitude as to appear mere specks in the sky. The long-pointed wings were seemingly much curved, and I had also remarked on the previous day, when the bird was seated on the truck, that the centre tail-feathers are very elongated, which agrees with Temminck's description, "longueur des filets, de 6 à 8 pouces." He also observes of its habits, "très abondant sur les bancs de Terre Neuve."

White-winged Gull (*Larus leucopterus*). June 8th: there are generally a few gulls in sight, but to-day I observed them following in the wake of the vessel, and wheeling round as they approached the stern; their flight is most buoyant. It is the same species that I had noticed on the outward voyage in July, 1857, and which I have now no reason to doubt is the Larus leucopterus. The head, neck and belly are white; the upper parts cinereous or bluish gray. But its distinguishing mark, as I formerly observed, is the patch of white on the margin of the gray wing, which looks

as if cut out. Temminck had noticed this, for he says, "rémiges terminées par un grand espace blanc."

Ash-coloured Sandpiper (*Tringa cinerea*). When in soundings, off Newfoundland, several flocks of light gray birds, of this species I believe, — which Wilson says is in summer "of a pale drab or dun-colour," — were seen skimming over the water, with a rapid and direct flight. Though frequently passing at no great distance, they were at times scarcely discernible amid the white-capped undulating waves; so possibly they may have been the sanderling plover.

Kittiwake (*Larus tridactylus*). June 9th: observed a few gulls of a different species. June 10th: the small gulls, seen yesterday, are still following us, and prove to be kittiwakes. The wings are elongated and tipped with black; the back of a darkish gray. Bill short and of a light horn-colour; the head and the whole of the under parts pure white. Feet and tarsi black.

Gannet (*Sula alba*). June 11th, 6 a.m.: in view of the north-west coast of Ireland; at 11, a.m., when abreast of Tory Island, saw some small flocks of gannets, flying in files like geese.

Guillemot (*Uria troile*). June 11th: great numbers of these birds were seen; and seemingly so little heeding the approach of the steamer, that they were frequently almost under the bows before taking wing or diving.

It may appear somewhat strange that so few birds are seen in a voyage of two thousand miles, but it should be borne in mind that in the fathomless ocean their means of subsistence must be very precarious, and that the glaucous gull, which, according to Dr. Richardson (see Macgillivray, vol. ii. p. 560), swallows two auks at a meal, would necessarily in its wide-world wanderings be reduced to more humble fare, even vegetable diet,—a share of the gulf-weed, with the storm petrel, for instance. On the outward passage I did not meet with a greater variety, for though there was a dark gull seen, it was probably the young of Larus leucopterus, though apparently somewhat larger than the adult, but the dusky plumage may have deceived me as to its size, for I was at first inclined to believe that it was an immature glaucous, which is described by Temminck as having "les nuances générales des teintes grises et brunes."— *Id.*

On the Nidification of the Kingfisher (Alcedo Ispida).—Ornithologists are divided in opinion as to whether the fish-bones found in the cavity in which the kingfisher deposits its eggs are to be considered in the light of a nest, or as merely the castings from the bird during the period of incubation. Some are disposed to consider these bones as entirely the castings and fæces of the young brood of the year before they quit the nest, and that the same hole being frequented for a succession of years, a great mass is at length formed; while others believe that they are deposited by the parents as a platform for the eggs, constituting in fact a nest; in which latter view I fully concur, and the following are my reasons for so doing:—On the 18th of the past month of April, during one of my fishing excursions on the Thames, I saw a hole in a precipitous bank, which I felt assured was a nesting-place of the kingfisher, and on passing a spare top of my fly-rod to the extremity of the hole, a distance of nearly three feet, I brought out some freshly-cast bones of fish, convincing me that I was right in my surmise. The day following, the 9th of May, I again visited the spot with a spade, and, after removing nearly two feet square of the turf, dug down to the nest without disturbing the entrance-hole or the passage which led to it. Here I found

four eggs placed on the usual layer of fish-bones; all of these I removed with care, and then filled up the hole, beating the earth down as hard as the bank itself, and replacing the sod on the top in order that barge-horses passing to and fro might not put a foot in the hole. A fortnight afterwards the bird was seen to leave the hole again, and my suspicion was awakened that she had taken to her old breeding-quarters a second time. The first opportunity I had of again visiting this place, which was exactly twenty-one days from the date of my former exploration and taking the eggs, I again passed the top of my fly-rod up the hole, and found not only that the hole was of the former length, but that the female was within. I then took a large mass of cotton wool from my collecting-box, and stuffed it to the extremity of the hole, in order to preserve the eggs and nest from damage during my again laying it open from above. On removing the sod and digging down as before, I came upon the cotton wool, and beneath it a well-formed nest of fish-bones, the size of a small saucer, the walls of which were fully half an inch thick, together with eight beautiful eggs and the old female herself. This nest and eggs I removed with the greatest care; and I now have the pleasure of exhibiting it to the Society, before its transmission to the British Museum, the proper resting-place of so interesting a bird's nest. This mass of bones then, weighing seven hundred grains, had been cast up and deposited by the bird or the bird and its mate, besides the unusual number of eight eggs, in the short space of twenty-one days. To gain anything like an approximate idea of the number of fish that had been taken to form this mass, the skeleton of a minnow, their usual food, must be carefully made and weighed; and this I may probably do upon some future occasion. I think we may now conclude, from what I have adduced, that the bird purposely deposits these bones as a nest, and nothing can be better adapted, as a platform, to defend the eggs from the damp earth. — *John Gould; in* '*Zoological Society's Proceedings*,' 1859, p. 152.

On the Habits of the Black-winged Stilt, as observed on its occurrence in Sussex.— On the 17th of May last a specimen of the black-winged stilt (*Himantopus melanopterus*) was killed on the banks of a small pond about a mile from this place, in a partially enclosed district surrounded by unreclaimed moorland, near the junction of Midhurst and Bepton Commons. This is the first time that the stilt has ever been obtained or seen in the county of Sussex, and it would appear to be nearly equally scarce in all parts of the British islands. Opportunities for observing the habits and manners of these rare and accidental visitors so seldom occur, that I shall make no apology for the length of this communication. Apart, however, from the rarity of the species, there are circumstances attending the occurrence of the individual in question which appear to me to be especially worthy of notice, as tending to throw some light on its remarkable, and, to the ordinary observer, grotesque external conformation. The pond to which I have alluded is very shallow; the depth of the water, even at fifteen paces from the shore, scarcely exceeding a foot. About that distance from the banks the surface was covered with numerous blossoms of the water crow-foot (*Ranunculus aquatilis*). On examining these next day, and frequently afterwards during last month, I found them inhabited by numerous minute Dipterous and Coleopterous insects (small flies, midges and beetles), comfortably nestled at the bottom of the flowers among the stamens, from which, indeed, none but the most delicate and attenuated instrument would be capable of extracting them without at the same time injuring the blossoms. Now, not one of our wading or swimming birds, except the stilt, possesses a beak perfectly adapted to this purpose. But the stilt has a bill

almost as finely pointed as that of a humming-bird; and those which make the nearest approach to it, as some among the smaller Tringæ, want the accompaniment of length of limb — that unusual development of tibia and tarsus — to enable them to wade to a sufficient distance from the shore. The bird was first noticed by an intelligent lad, the son of a small farmer of the name of Pearson, while driving the cows home to be milked in the evening. It was then standing nearly up to its belly in the water, and rapidly extracting the insects from the flowers, or, as the boy supposed, picking the petals themselves. It allowed him to approach within twenty yards before it took flight, when it extended its long red legs behind it, after the manner of a heron, and, alighting again on the opposite bank, immediately recommenced wading out to the water-plants. Young Pearson then hastened home to his father, who lives at a short distance from the pond, and the latter, hurrying to the spot with a loaded gun, found the bird employed as before among the flowers of the water crow-foot. But it was now exceedingly shy and wary of the gun, flying from one side of the pond to the other, before Pearson could get within shot (but never uttering any cry or sound), so that at last he found it necessary to resort to stratagem, and to endeavour to "stalk" the bird. This a newly-made ditch and bank, one extremity of which approaches within a few yards of the water's edge, enabled him to do successfully. On raising his head above the bank, just before he fired, he perceived the stilt within twenty yards of him, knee-deep in the water, in the midst of a cloud of gnats and midges, at which he was snapping right and left, much after the manner (to use Pearson's own simile) of a dog when teased by the flies in hot weather. The bird, fortunately but little injured by the shot, was brought to me on the following morning, and, on subsequent dissection, proved to be a female. The ovarium contained several eggs, the largest of which was about the size of a pea. The stomach was crammed with beetles and gnats in a half-digested state; the elytra of the former showing that different species had been captured. After the first pleasurable sensations on possessing and examining in the flesh a perfect specimen of so rare a visitor had passed away, I could not help being struck with the remarkable tenuity of the tips of the mandibles, as well as by the more obvious peculiarity from which the bird has derived its name (the extraordinary length of its legs); but after listening to the simple story of George Pearson and his son, I perceived that the mystery was solved, and that here was a new instance of the wonderful adaptation of means to an end, of structure to habits, such interesting examples of which are continually presenting themselves to the observant naturalist.—*A. E. Knox; in the* '*Ibis*,' i. 395.

Occurrence of the Cream-coloured Courser at Braunton Burrows.—While shooting on Braunton Burrows, about ten days ago, I observed a pair of strange birds in the air flying round one of the large ponds left by the recent rains: after a little while they settled on the margin of the pond; they were then about three hundred yards from me: by keeping out of sight behind the sand-hills I was able to get within a hundred yards of them, and I was greatly surprised, on looking over the brow of the hill, to see a fine pair of the cream-coloured courser (*Cursorius Isabellinus*), one an adult male in splendid plumage, the other a female or young bird of the year in immature plumage; they were accompanied by a single lapwing, which kept incessantly getting up and flying over their heads screaming, which caused the birds to be wild. I waited about half an hour behind the hill, in the hope that they would walk within shot, but they were wise and would not, so I tried to walk within shot of them, as I found sitting-still rather unpleasant, particularly as the day was exceedingly

windy and cold. The birds, however, would not wait, but flew off directly I showed myself, and pitched again close to the next pond some distance off; I followed, but could not get near them, and this time they flew right up into the clouds out of sight, uttering a peculiar cry. I am quite certain as to the identity of the species, else I would not trouble you with this. — *Gervase F. Mathew; Raleigh House, near Barnstaple, April* 2, 1860.

The Great Auk. — The great auk has not been met with by any of the modern Arctic Expeditions. I was told in South Greenland that some, twenty-five years ago a young specimen was obtained, but am not at all certain of the fact. The resident Europeans are quite aware of the value attached by naturalists to the bird, so have kept a sharp look-out for it. I have myself collected birds during my four arctic voyages, all of which are now in the museum of the Royal Dublin Society. I am not aware of there being any new species among them. — *F. J. M'Clintock; in a letter to R. Champeen, Esq., Scarborough.*

Use of the Albatross.— My son, who has just been round the Cape, brought me, as a curiosity, the radius or small bone of the wing of an albatross, which is much in request among sailors, as making an excellent tube for a pipe. The one I have is long, perfectly smooth, and black from smoking. He has seen them considerably longer. The following *jeu d'esprit*," written by a friend of his on the subject, shows the practical turn that Jack's mind has taken since the days of Coleridge's 'Ancient Mariner:'—

A dead loss was the albatross
The "Ancient Mariner" slew;
The modern Tar, acuter far,
Makes him into a stew.

Day after day did that silly old man
Over his dead bird cry;
The "Mid," more ripe, of its wing makes a pipe,
And smokes therein "Bird's-eye."

—*E. Horton; Wick, Worcester, March* 31, 1860.

Account of a Visit to a Nesting-place of the Frigate-bird (Fregata Aquila, *L.*).— On the 1st of January, 1858, we went off in a boat with four rowers to visit an island some four or five miles from Tigré Island, in the Bay of Fonseca, on the Pacific coast of Honduras. It is called Bird Island, and is not more than an acre in extent, and of an oblong shape. At one end the beach is sandy, and at low water one can walk across to another island close adjoining. At the other end the shore is rocky, and it is much the same at the sides, the beach being strewn with large volcanic stones. The surface of the island is some thirty or forty feet above the sea-level; it is covered with long grass, and there are also a few trees and low shrubs — mangroves (*Rhizophora mangle*, Linn.)—growing in places, especially about high water-mark. At a distance the most conspicuous object was a numerous flight of frigate-birds soaring over the island. As we approached, large white patches, caused by the droppings of the birds, became visible. We landed on the flat sandy beach, and in a few minutes I had shot a pair of tiger bitterns (*Tigrisoma tigrinum*), which allowed me to approach without any difficulty. Besides these and the frigate-birds we saw no birds on the island, except a few pelicans, some large Accipitres and a single booby (*Sula fusca*), which had its nest on a low tree, in company with the frigate-birds. The whole island was

appropriated by the latter. Nearly every tree and bush, both high and low, was covered with birds and their nests. The latter were mostly composed of a few sticks laid crosswise, hardly as much in quantity as in the nest of the ring dove (*Columba palumbus*). Each nest contained a single egg, about the size of a hen's egg, and of a chalky whiteness. We brought away nearly a hundred of them. Some were quite fresh, and others had been sat upon some days. Although the nests were upon low bushes, still they were placed just too high for one to reach the eggs without climbing. Many of the nests were on the mangrove bushes which were growing just above high water mark, so that we could see into them when standing on the bank of the island, which was at a higher level. Some of the birds were sitting on their nests, and others were perched upon the branches. By firing into the mass I might have killed a dozen at a shot; but shooting would have been an absurdity, for I could have obtained any number with a stick. The difficulty was to get them off their nests. Shouting had little or no effect, and even the report of a gun would only rouse a few, who would frequently settle again on the bushes. I threw some stones among them, without producing much result, and even tried to poke them off their seats with my gun; but they merely snapped their beaks at me in retaliation. All this time there were thousands of other birds soaring in the air a little way above our heads. I observed that the frigate-birds were of three different plumages. As there were birds of all three sorts sitting together, and with their nests in the same bushes, I concluded that they were of one and the same species — males, females and immature birds. Some have the head and neck white, the beak white, the feet and legs bluish white, the belly white, and the wing-coverts grayish brown. Others have the legs and feet black, and are black all over, with a greenish metallic tinge on the back. These have a bright scarlet pouch, which they inflate to the size of an ostrich's egg while on the wing. The boatmen informed me that these were the male birds. Others, probably immature birds, had the head black, the throat white, and the legs and feet pink. All had long, black, forked tails. I obtained a specimen of each, but did not preserve them, as I had much to do, and besides they are stinking birds to handle, as bad as or worse than the turkey buzzard (*Cathartes*). The pelicans have also a breeding-place in Fonseca Bay, but it is in an island at some distance from the one in possession of the frigate-birds.—*G. C. Taylor; in the* '*Ibis*,' i. 152.

Great Mortality amongst Woodcocks (Scolopax rusticola).—Woodcocks have been extremely scarce this season, which scarcity is accounted for by the fact that hundreds of thousands of these birds were drowned during their migration towards these shores, on the night of the terrific gale in which the "Royal Charter" was lost. In this county, which is not a bad locality for this species, scarcely a pair have been procured; sportsmen have hunted for this favoured and dainty morsel, but in vain. — *S. P. Saville; Jesus Terrace, Cambridge, March* 14, 1860.

A Kittiwake Gull (Larus tridactylus) *driven Inland by the late Terrific Gales.*— On the 28th inst., the day of the tremendous hurricane, a labouring man picked up, in an entirely exhausted state, a kittiwake, in adult plumage, by the side of the River Carn: the bird allowed itself to be approached and taken up, so grea t was its exhaustion.—*Id.*

Dates of Arrival of Migratory Birds. — April 19th, 1859: I heard the blackcap and the willow wren in the garden. April 23rd: saw a pair of swallows hawking over the round pond; also saw a redstart. May 1st, Sunday afternoon: saw sand martins and house martins flying together about the heath. May 6th, at Chester: saw swifts

darting about and frequently resting on the old church-tower by the Cheese Mart; they seemed tired and resting after their long journey. September 21st: hundreds of swallows resting on the heath.—*Matthew Hutchinson; Blackheath, Kent.*

The Snake Stone. By Edward Newman.

I am rejoiced to find in Mr. Gosse an advocate for inquiry into the long-accepted belief in certain natural phenomena which we cannot test by the evidence of our senses, as we sit in our well-warmed museums, surrounded by the trophies of the bird-stuffer's imagination. The belief in what we see is far more dangerous than the belief carefully deduced from evidence of what we cannot see. Many a stuffed owl is more improbable than a sea serpent: a snake stone is a valuable truth by the side of a British black woodpecker, the skeleton of a mermaid or a talking fish. I have often been astonished at the ridicule thrown over facts that we cannot understand. Men of learning who laugh at a phenomenon they have not seen always remind me of giggling girls who titter when they hear two persons speak any language but their own: the cause of cachination is the same, simple ignorance. The 'Zoologist' shall always be open to discussions on either of the subjects mentioned by Mr. Gosse, and it gives me great pleasure in this number to identify a sea serpent, and to prove, from the evidence of a witness whose veracity is unquestioned, the valuable properties of the snake stone. I quote Sir Emerson Tennant's 'Ceylon.'

"The use of the Pambo-Kaloo or snake stone, as a remedy in cases of wounds by venomous serpents, has probably been communicated to the Singalese by the itinerant snake-charmers who resort to the island from the coast of Coromandel; and more than one well-authenticated instance of its successful application has been told to me by persons who had been eye-witnesses to what they described. On one occasion, in March, 1854, a friend of mine was riding, with some other civil officers of the Government, along a jungle path in the vicinity of Bintenne, when they saw one of two Samils, who were approaching them, suddenly dart into the forest and return, holding, in both hands, a cobra de capello which he had seized by the head and tail. He called to his companion for assistance to place it in their covered basket, but, in doing this, he handled it so inexpertly that it seized him by the finger and retained its hold for a

few seconds, as if unable to retract its fangs. The blood flowed, and intense pain appeared to follow almost immediately; but with all expedition the friend of the sufferer undid his waistcloth, and took from it two snake stones, each of the size of a small almond, intensely black and highly polished, though of an extremely light substance. Then he applied one to each wound inflicted by the teeth of the serpent, to which the stones attached themselves closely, the blood that oozed from the bites being rapidly imbibed by the porous texture of the article applied. The stones adhered tenaciously for three or four minutes, the wounded man's companion in the meantime rubbing his arm downwards from the shoulder towards the fingers. At length the snake stones dropped off of their own accord; the suffering appeared to have subsided; he twisted his fingers till the joints cracked, and went on his way without concern." Here follows a similar instance, which there is no need of quoting: the question occurs, What is this snake stone? and does it perform the cure which it appeared to perform? There may be some difference of opinion on this second point; it may therefore be left an open one, but What is the snake stone? here is Sir Emerson Tennant's reply.

"As to the snake stone itself, I submitted one, the application of which I have been describing, to Mr. Faraday, and he has communicated to me, as the result of his analysis, his belief that it is a piece of charred bone which has been filled with blood, perhaps several times, and then carefully charred again. Evidence of this is afforded, as well by the apertures of cells or tubes on its surface, as by the fact that it yields and breaks under pressure and exhibits an organic structure within. When heated slightly, water rises in it, and also a little ammonia; and if heated still more highly in the air, carbon burns away, and a bulky white ash is left, retaining the shape and size of the stone. This ash, as is evident from inspection, cannot have belonged to any vegetable substance, for it is almost entirely composed of phosphate of lime." Mr. Faraday adds that "if the piece of matter has ever been employed as a spongy absorbent, it seems hardly fit for that purpose in its present state; but who can say to what treatment it has been subjected since it was fit for use, or to what treatment the natives may submit it when expecting to have occasion to use it?"—Vol. i. p. 200.

"The probability is that the animal charcoal, when instantaneously applied, may be sufficiently porous and absorbent to extract the venom from the recent wound, together with a portion of the blood,

before it has had time to be carried into the system; and that the blood which Mr. Faraday detected in the specimen submitted to him was that of the Indian on whose person the effect was exhibited, on the occasion to which my informant was an eye-witness. The snake-charmers from the coast of Ceylon profess to prepare the snake stones for themselves and preserve the composition as a secret. Dr. Davey, on the authority of Sir Alexander Johnson, says the manufacture of them is a lucrative trade, carried on by the monks at Manilla, who supply the merchants of India, and his analysis confirms that of Mr. Faraday."

EDWARD NEWMAN.

The Great Sea Serpent.—The following extract from the log of the "British Banner," which arrived at Liverpool on Sunday 18th March last, appeared in the 'Liverpool Daily Post' of March 20th. "On the 25th April, in latitude 12° 7″ east, and longitude 93° 52″ south, felt a strong sensation as if the ship were trembling. Sent second mate to see what was up; the latter called out to me to go up the fore-rigging and look over the bows. I did so, and saw an enormous serpent shaking the bowsprit with his mouth. There was about thirty feet of the serpent out of the water, and I could see his tail in the water abaft of our stern; must have been at least three hundred feet long; was about the circumference of a very wide crinoline petticoat, with black back, shaggy mane, horn on his forehead, and large glaring eyes, placed rather near the nose, and jaws about eight feet long. He did not observe me, and continued to shake the bowsprit and to throw the sea alongside into a foam until, the former came clear away of the ship. The serpent was powerful enough, although the ship was carrying all sail, and going at about six knots at the time he attacked us, to stop her way completely. When the bowsprit with the jibboom sails and rigging went by the board, the monster swallowed the foretopmast staysail and flying jib, with the greatest apparent ease; he also snapped the thickest of the rigging asunder like thread. He sheered off a little after this, and returned apparently to scratch himself against the side of the ship, making a most extraordinary noise resembling that on board a steamer when the boilers are blowing off. A whale breached within a mile of the ship at this time, and the serpent darted off after it like a flash of lightning, striking the vessel with his tail, and staving in all the starboard quarter galley. Saw no more of it, but caught a young one in the afternoon, and brought it on to Melbourne.—*William Taylor, Master, British Banner.*" (The "British Banner" arrived here on Sunday, and is now in the Albert Dock. Captain Taylor declares that the above statement is perfectly correct.—*Editor Daily Post*).

[It is impossible for any story to read more like a hoax than this, but I had ready means of procuring, through a friend at Lloyd's, the information that there is such a ship as the "British Banner," that she is commanded by Mr. William Taylor, a respectable and trustworthy gentleman, and that she did arrive at Liverpool on Sunday, 18th March, last past, and is now in the Albert Dock. Armed with this information, I wrote to Captain Taylor, who has replied in the most courteous

manner: he confirms the above statement, adding that he sent it to the "Daily Post" himself, and adding also that the young one reported to have been caught was presented to the Museum at Melbourne, where it was thoroughly inspected and pronounced to be a veritable sea serpent.—*Edward Newman*].

An Account of the Bermudian Riband Fish.

By J. Mathew Jones, Esq.

[I have received the following particulars of this most interesting capture from an old and valued correspondent of the 'Zoologist.' It must be read in connexion with a previous note on the same animal in the April number of the 'Zoologist' (Zool. 6934).—*Edward Newman*].

Order Acanthopterygii.

Family Cepolidæ.

Genus Gymnetrus.

Body attenuate, compressed, naked, tuberculate; cuticle, a silvery covering of metallic lustre. Length, from facialto caudal extremities, sixteen feet seven inches. Depth, at fourteen inches from facial extremity, nine inches, and increasing gradually to near the ventral extremity of the stomach, when it attained its greatest depth of eleven inches, and then decreased by degrees to the caudal termination. Width, at the same distance and through the spinal column, two and a half to three inches.

These dimensions are in the extreme.

From the frontal extremity of the caput (excepting a slight depression at the occiput) to the position at which the above dimensions of depth and width were taken, a gradual elevation of the dorsal ridge took place, and from the capital portion of this ridge arose at equal distances from each other, a series of ten or eleven erect, quill-like, flexile filaments, from two to three feet in extent, gradually tapering from base to apex, and possessing, in the case of the three longest, lanceolate points. These capital filaments were, with the exception of the three anterior ones, unconnected by membrane. From this series of lengthened filaments, all along the back, from head to tail, extended a series of intermittent fins, so closely situate to each other as to present the appearance of a single fin, and having the spinose rays of each individual fin joined by the connecting membrane. The ventral fins were entirely destroyed, save a portion of the right ven-

tral, which is sufficient to show that it was composed of two consistent bony rays, which probably extended some distance from the body and must have formed a powerful engine of direction. The pectorals were almost entirely destroyed, although the base of the right pectoral was sufficiently complete to enable me to state that it contained twelve spines. Anal and caudal fins absent.

Head truncated, compressed; facial outline of a dark colour.

Mouth so damaged as not to be positively determinable as regards form and appearance, but from the portions of jaw still remaining I should pronounce it malacostomous.

Eyes fourteen lines in diameter, slightly depressed. Irides three and a half lines in width, of a bright silver, encircling pupils of a somewhat oval shape, and, in colour, a light transparent blue.

Stomach: intestinal chamber, extending from beneath the gills to the anal extremity, five feet. Unfortunately this chamber had been opened and its contents partially injured before I saw the specimen, but a large proportion of milt, intestine, &c., has been preserved, including the major portion of the swimming bladder, which for so large a fish may be considered small. Its colour a bright scarlet. This swimming bladder contained a large amount of oily matter, and a piece thrown on the ruffled surface of the water immediately stilled the agitation.

Gill-rays eight in number, four to a side, crimson, flabellate; the anterior pairs furnished with double rows of flabels, having the internals white, and armed on their inner sides with minute dark-like appendages.

Gill-covers bony, radiate, not entirely covering the gills.

Teeth: no appearance of any.

In concluding the above description, I must not omit to state that it was a male fish, and from the extremely fragile nature of its various parts, I may venture to express an opinion that it had by no means attained maturity. I may also remark that my measurements were taken twenty-two hours after death, during which time it had lain exposed on the rocky shore.

This genus of acanthopterygious fishes is of a form so thin and flat, in proportion to its length, as to have obtained among the ancient ichthyologists the name of "riband fish." Although several species are known to Science, yet they are all of diminutive size in comparison with the individual now obtained; Gymnetrus Hawkenii, G. Banksii and G. Glesne are occasionally found in the British seas.

So little appears to be known of this singular tribe of fishes that,

even in the present advanced state of marine zoology, their habits, haunts, &c., remain blanks in the Book of Nature, and will probably long continue so, unless opportunities like the present should occur, to enable us to add new facts in the history of these remarkable creatures.

The most notable fact, however, in connexion with the capture of the present specimen, will doubtless be the interest and attraction it will produce in the scientific world, for most assuredly we have in the specimen now before us many of the peculiarities, save size, with which the appearance of that hitherto apochryphal monster, the "great sea serpent," as detailed by navigators, is invested. The lengthened filaments crowning the caput, joined anteriorly by the connecting membrane, and extending to the shoulders, would, viewed from a vessel's deck, present to the spectator the mane so accurately described as a singular feature in the gigantic specimen seen by Captain McQuhæ, R.N. and officers of H.M.S. "Dædalus." Then again, the rapidity with which that individual specimen moved through the water, would coincide with the capabilities of a member of this genus, for the motive power produced by such an extent of tail, coupled with the extremely compressed form of body from the head throughout, must be immense.

Here then we have a partial elucidation of the various statements which have at intervals appeared in the columns of the united presses of England and America, emanating from the pens of travellers, and usually headed—"Occurrence of the Great Sea Serpent,"—criticized, however, in an ungenerous manner, and always exposed to an unmerited ridicule at the hands of the many, but, nevertheless, firmly believed in by the few, who have patiently waited to see the day when the mystic cloud which has hitherto veiled the existence of the maned denizen of the deep should vanish with the suspicion of the sceptic, and exhibit more clearly the truth of the assertions of those ill-used men, who, endeavouring like useful members of society to extend the cause of natural knowledge by publishing candid accounts of what their eyes have seen, have always met with an amount of contempt and reproach, sufficient to silence for ever the pen of many a truthful writer.

I am sorry I have not the No. of the 'Illustrated London News' at hand in which Captain McQuhæ's graphic statement appeared, as it would have afforded me an opportunity of particularising other features in connexion with his specimen and the present one. The

facts, however, regarding the mane-like appendage, and the rapidity of motion to which I have alluded, are still fresh in my memory.

My best thanks are due to Mr. George Trimingham, the captor, for the generous manner in which he placed the fish at my disposal.

J. Mathew Jones.

Note on an Ophioid Fish lately taken in the Island of Bermuda, which appears to be new to Science. By Edward Newman, Memb. Imp. L. C. Acad.

I hope that zoologists will not consider me assuming the office of a teacher if I add a few memoranda on the family of fishes to which Mr. Jones' specimen belongs: if such should, however, unfortunately prove the case,—should my readers remind me that my editorial privileges scarcely extend to the right of appending notes to the productions of a much more able ichthyologist than myself,—I can only plead in mitigation that this family of fishes is one

"In which my spirit doth take delight,"

from their evident approach to that much-abused sea serpent, in the existence of which I have ever entertained the most unwavering belief.

The family Cepolidæ or riband fishes is so named from the Cepola rubescens of Linneus, the red snake-fish of Couch, described in the fourteenth volume of the 'Linnean Transactions,' page 76, a small snake-like fish not uncommon off the coast of Cornwall, but of which the largest preserved specimen is less than twenty inches in length: the body is very long, thin, compressed laterally and riband-shaped, not cylindrical, like the body of a snake, and the dorsal, caudal and anal fins appear to combine in forming a continuous fringe of fin extending from behind the head to the extreme caudal extremity, and thence returning along the belly and reaching nearly to the throat.

Of this family six species, belonging to as many genera, have been found in the British seas:—1, the red snake-fish (*Cepola rubescens*); 2, the Vaagmær or Deal-fish (*Trachypterus bogmarus*); 3, the silvery hair-tail (*Trichiurus lepturus*); 4, the scabbard-fish (*Lepidopus argyreus*); 5, Hawken's Gymnetrus (*Gymnetrus Hawkenii*); and 6, Banks' Gymnetrus (*Regalecus Banksii*), which I think identical with

the Ophidium Glesne of Ascanius, in the 'Copenhagen Memoirs' for 1776, as also with the Gymnetrus Banksii of Cuvier and Valenciennes, 'Poissons,' tome x. p. 365; with the Regalecus Banksii of Richardson, in the 'Second Supplement to Yarrell's British Fishes'; and perhaps also with the Gymnetrus Grillii of Linroth, described in 1798.

Sir John Richardson seems to regard the genera Gymnetrus and Regalecus as identical, and gives the latter the preference on the ground of priority. Cuvier and Valenciennes, however, retain the more classically-derived word Gymnetrus, rejecting Regalecus, a Norse-latin compound signifying the "king of the herrings," on account of its barbarity. I think the views of these naturalists may be met by adopting both genera, treating the species Hawkenii as the type of Gymnetrus, and Banksii as the type of Regalecus, more especially as Sir John Richardson's characters of Regalecus, now immediately to be quoted, agree minutely with Banksii, but by no means with Hawkenii.

Regalecus.—"Greatly compressed and elongated sword-shaped fishes. Teeth minute or none. Dorsal fin rising on the occiput like a plume. Caudal said to be continuous with the dorsal, and to embrace the point of the tail, but seldom seen entire, and of doubtful form in most species; ventrals uniradiate and very long, edged with membrane which expands at the end. Branchiostegals seven. A very long slender tapering stomach, of which three-fourths is cœcal; pancreatic cœca simple and very numerous. Scales microscopical in the nacry epidermis, also scattered osteoid tubercles on the skin."

A great number of individuals referrible to this genus have been taken at different times in the British seas, and I think it is commonly accepted that they constitute but a single species: of this, however, there is no means of judging with any degree of precision. All the specimens appear immature and all imperfect; they vary extremely in length, the shortest I recollect having been recorded in the 'Zoologist,' measuring twelve feet, and the longest twenty-four feet, and their fin-rays, as in the minnow fry, have not acquired that solidity which is the character of adult age. These juveniles clearly indicate the existence of some monster denizens of the deep which have not yet gladdened the eyes of the scientific. The best description of any individual specimen I have seen is that by Messrs. Hancock and Embleton, read before the Tyneside Naturalists' Club, and published in the 'Annals of Natural History' for July, 1849. The following abridged extracts from this description are reprinted

from Sir John Richardson's 'Second Supplement to Yarrell's British Fishes,' a work in which will be found an admirable *resumé* of all that is known of these interesting fishes. The description cited was made from a specimen taken at Cullercoats on the 26th of March, 1849.

"The fish, though much injured and greatly faded, was fresh and had a uniform silvery gray colour, except a few irregular streaks and dark spots towards the fore part of the body, and these were remains of a bright iridescence about the pectoral fin and head, a blue tint predominating. The body is excessively compressed, like a double-edged sword-blade, its greatest thickness being below the middle, and the dorsal edge is sharper than the ventral one. The total length when the mouth is retracted is twelve feet three inches, and the depth immediately behind the gills eight inches and a half; two feet farther back the greatest depth of eleven inches and a quarter is attained, and at the end of the dorsal fin it has diminished to three. The skin is covered with a silvery matter in which the scales are invisible to the naked eye, but which is easily detached and adheres to anything it comes in contact with. Submitted to the microscope, this nacre was found to consist of scales like those on the wing of a moth. Round the hind border of the operculum there is a broad dusky patch; a crescentic dark mark exists above the eye, and there are eight or nine narrow oblique streaks on the side, which diminish to mere spots beyond the vent. The lateral line descends gradually from the supra-scapula to within two inches of the ventral profile at the vent, and continues descending as it proceeds to the distal end of the fish. Four flattened ridges, each more than an inch in breadth, reach from the head to the tail above the lateral line, the longest and uppermost commencing near the eye. The skin is studded with numerous bony tubercles not regularly arranged, and in the neighbourhood of the head they are replaced by depressed indurations. On the ventral edge the tubercles are numerous and have hooked tips pointing towards the tail. The head is small, measuring only nine inches to the gill-opening; the orifice of the mouth is circular, and capable of being protruded two or three inches by the depression of the mandible: the tongue is small, smooth and prominent; there are no teeth, and the interior of the mouth is black. Gill-plates proportionally large; preoperculum crescentic, with the lower horn prolonged forwards to the articulation of the mandible; operculum curved elliptically posteriorly, ending obtusely. Branchiostegals seven. Branchial arches four, with tubercular bristly rakers. Pharyngeal bones above and below furnished with setaceous teeth. The dorsal fin extends from between the front of the orbits

to within three inches of the distal extremity of the fish. The twelve anterior rays were stated by the captors to have been about fourteen inches long, and furnished with a membrane on their posterior edges, which grew wider upwards, somewhat like a peacock's feather. The ends were broken off, but a continuous membrane connected their bases, and their shafts appeared ragged with the remains of the torn membrane. In addition to these there were 268 other rays whose acute points overtopped the connecting membrane, or 280 dorsal rays in all. About the middle of the fish, where the dorsal rays are highest, excepting those on the head, they measure upwards of three inches and a half, and at the termination of the fin their height has increased to one inch. Behind the termination of the dorsal fin, the edge of the back slopes rapidly downwards to within an inch of the line of the belly, and then forms a rounded point, which is the distal extremity of the fish. Both the upper and under edges of this extremity are very thin, and the fishermen insisted that when they took the fish this part was entire, and that there was no tail-fin whatever. The edges may may be pressed together, and seem to fit. The pectorals are attached low, and contain eleven rays. The ventral fins were represented by a pair of very strong straight spines broken short to the length of four inches, but were said to have been originally twice that length, having even then broken ends ; a membranous edge was visible at their bases. The vertebræ, judging from elevations obscurely seen through the muscles, were reckoned at 110. Fin-ray formula, D. 280, V. 1, P. 11, Vertebræ, 110 ?—*Hancock and Embleton l. c.*"

In the foregoing description are many points of similarity to Mr. Jones' fish, but still there are other points in which the two fishes are so decidedly dissimilar that I venture to consider them distinct, and to propose for the Bermudian fish the name of Regalecus Jonesii, as a well-merited tribute to the zeal and industry of the accomplished naturalist who has favoured me with the description. I am sure that naturalists will pardon the omission of specific characters, as I could only copy those which Mr. Jones has so admirably given in the preceding paper. The characters I shall notice are differential only.

Regalecus Jonesii, *Newman.*

In Regalecus Jonesii the flexile rays constituting the plume on the crown of the head, with the exception of the three anterior ones, are connected by membrane, and the three which are so connected have lanceolate points. In R. Banksii all these rays are connected by membrane : the first is clavate at the extremity, the second, third

and fourth acute, and the seven following ones clavate. In Regalecus Jonesii there is a series of dorsal fins all along the back, the rays in each fin being connected by membrane, but the fins not being connected with each other. In Regalecus Banksii there is but one fin, and that is continuous from head to tail. In Regalecus Jonesii the ventrals have two consistent bony rays; in Regalecus Banksii they have but one. These differences, combined with the difference of habitat, Regalecus Jonesii in the North Atlantic Ocean and Regalecus Banksii in the German Ocean seem to render it apparent that the two species are perfectly and permanently distinct.

In reference to the last question mooted by Mr. Jones, the similarity of Regalecus Jonesii to Captain M'Quhæ's sea serpent, I do not consider myself competent to express an opinion. I am quite willing for the present to allow every sea serpent to hold on its own course; hereafter a better opportunity may be afforded on comparing and arranging the conflicting evidence already published in the 'Zoologist.'

EDWARD NEWMAN.

Occurrence of the Sea Bullhead at Montrose.—In the third edition of 'Yarrell's British Fishes,' recently published, mention is made of the discovery in Dingle Harbour of an example of Fabricius' sea bullhead (*Acanthocottus grœnlandicus*), and a figure and description of the species are given. A characteristic specimen of the same fish was taken two years ago in the basin of the South Esk, at Montrose, from a salmon-net, by William Beattie, Esq., Secretary to the Montrose Natural History and Antiquarian Society. The fish may therefore be considered as more than an accidental visitor of the British seas, and other examples will doubtless soon be found by the active and intelligent promoters of Natural-History museums in our sea-ports.—*John Richardson.*

Singular Account of the Sail Fluke (Zeugopterus velivolans).—Dr. Baikie, writing from the banks of the Niger, referred to by Dr. Alexander Duguid, of Kirkwall, for information respecting the very curious habits of this fish, and that gentleman, on being applied to, most kindly sent a sketch made by a friend of his, said to be very correct. He also furnished the following particulars of the history of the fish. This fluke, he says, is highly prized as an article of food, its flesh being firm and white. It does not take a bait, and he only once saw it caught in a net, but it comes ashore spontaneously, with its tail erected above the water, like a boat under sail, whence its name. This it does generally in calm weather, and on sandy shores, and the country people residing near such places train their dogs to catch it. The following letter was written by Mr. Robert Scarth, of North Ronaldshay, the northernmost island of the Orkney group, where the sail fluke is very common. "It is never caught by hook or by net, and I have in vain set ground lines for it in the South Bay, baited with lug-worms, limpets

and sellocks, neither have flounder or skate nets drawn there inclosed a sail fluke. It seldom comes to the shore earlier than October or later than April, though it is often driven by storms on the beach, entangled among sea-weed. The great supply is, however, obtained in the following manner. In the winter and early spring a pair of black-headed gulls take possession of the Bay, drive away all interlopers, and may be seen at daybreak every morning beating from side to side on the wing, and never both in one place, except in the act of crossing as they pass. The sail fluke skims the ridge of the wave towards the shore with its tail raised over its back, and when the wave recedes is left on the sand, into which it burrows so suddenly and completely that though I have watched its approach, only once have I succeeded in finding its burrow. The gull, however, has a surer eye, and, casting like a hawk, pounces on the fluke, from which by one stroke of his bill it extracts the liver. If not disturbed the gull no sooner gorges this luscious morsel than it commences dragging the fish to some outlying rock, where he and his consort may discuss it at leisure. By robbing the black-backs I have had the house supplied daily with this excellent fish in weather during which no fishing-boat could put to sea. Close to the beach of South Bay a stone wall has been raised to shelter the crops from the sea spray. Behind this we posted a smart lad, who kept his eye on the soaring gulls. The moment one of the birds made its well-known swoop, the boy rushed to the sea-strand, shouting with all his might. He was usually in time to scare the gull away and secure the fluke, but in almost every case with its liver torn out. If the gull by chance succeeded in carrying his prey off to the rock, he and his partner set up a triumphant cackling, as if deriding the disappointed lad. Seals often pursue these flukes into the Bay, and frequently leave serviceable morsels unconsumed. The sail fluke exhibits its gambols most frequently before a storm, or when a thaw succeeds a frost. It is the most delicious fish of our seas, but loses its flavour by a day's keeping."—*Sir John Richardson, in 2nd Supplement to 'Yarrell's British Fishes,' February* 19, 1849.

[At present the talented describer of this new British fluke has not had the opportunity of examining a specimen, and does not appear to feel much confidence that the species is absolutely new to Science.—*E. N.*].

Note on Pyrgoma, a Parasitic Cirripede. — It is well known that Pyrgoma anglicum, a little sessile barnacle, is always found parasitically seated upon the margin of the corallum of certain Caryophylliacea. In my account of Caryophyllia Smithii ('Actinol. Brit.' p. 315), I have observed that "two are sometimes found on the same coral." But I have just been presented, through the kindness of Mrs. Thynne, of Regent's Park, with specimens of the corallum of this species, one of which is crowned with no fewer than nine, the other with eleven, of the little Pyrgomata. The appearance of the ovate barnacles, each with its orifice crowded all round the edge of the coral, is exceedingly curious and novel. — *P. H. Gosse; Torquay, March* 31, 1860.

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*Observations on rearing Lepidopterous Larvæ.**

HAVING during the past season given a good deal of my spare time to rearing larvæ from the egg, I now venture to send you some notes of my proceedings, in the hope that—though they contain nothing wonderful or new—they may be of use to encourage other beginners to do something in the same way. Till lately I used to throw away in despair the eggs laid by captured moths, but this year I took an entirely opposite course, and kept every egg I could obtain, until, towards the end of summer, I was fairly beaten by numbers.

However, I have succeeded in bringing on to the state in which they should at present naturally be nearly sixty broods, varying in number of individuals from 3 to 3 × 30, and comprising more than forty species,—having let but one species of all that I took in hand slip through my fingers. The apparatus I have used is that recommended in the 'Entomologist's Annual' for 1855,—the flower-pot and glass cylinder,—and for a preparatory academy it answers admirably, giving to the juveniles light and security, and to their owner a much better opportunity of watching their forms and movements, whilst they are small and easily hidden, than any less open case can afford. It is also cheap; small flower-pots of course are not costly, and, as to glass cylinders, I use lamp-chimneys of old-fashioned forms, which the chandler was glad enough to get off his hands at a very low rate. When sand, in which to stick the food-plant, cannot be easily procured, fine earth will answer very well, and—if the remark be not thought too obvious—I may hint that, next to a growing plant, a young shoot on a bit of old wood or stem will last fresh longer than anything else; however, where possible, I always have (instead of leaves or twigs plucked off) a small growing plant, ready potted, before the larvæ are hatched. A little trouble spent in picking up, during one's rambles, seedling oaks, birches, thorns, or clean healthy plants of bedstraw, plantain, &c., will save one a great deal of after-trouble in changing food, as well as lessen the risk of injuring one's stock: a growing plant, if properly managed and proportioned to the number of mouths put upon it, will last good till most larvæ are big enough to be easily and safely removed to their finishing-cage: this may still be a flower-pot, larger of course than the first, and covered with leno,

* Reprinted from the 'Entomologist's Weekly Intelligencer.' The author is anonymous in the 'Intelligencer,' but I take on myself the responsibility of vouching for his statements, being well acquainted with his accuracy and veracity.—*Edward Newman.*

stretched (for the sake of more light and better ventilation) domewise over a couple of bent canes, the ends of which are stuck into the earth in the pot, and fastened with—not string—but an elastic band. Of course cages with glass sides would be best for continuing one's observations, but, where one has a number of species feeding at one time, a corresponding number of cages would entail a great expense. My nursery has, for the most part, been a room facing the East, the window being kept partially open night and day; a few things I put out of doors, not so much for their own health as that of the plants on which they were feeding, and which would have needed renewal oftener if kept in the house.

Perhaps I ought to say that my experience has been chiefly confined to Bombyces and Geometræ, and for these reasons:—I do not sugar, and I cannot induce the few Noctuæ that do fall into my hands to part with their eggs, whilst I find Geometræ to be, in this respect, almost as generous as Bombyces. A female moth shut up in a pill-box is almost sure to give you eggs, and if a sprig of the proper food be put in with her she will deposit them on that; you have then, on noticing a change in their colour, only to place sprig and all on the growing plant, and the larvæ will walk on to their pasture, without your having to hunt them about with a feather or camel's-hair pencil, neither of which perhaps feels quite so soft to their skins as it does to our own. When the food is unknown I think it is best to allow the larvæ to be hatched in the pill-box, and then give them their choice by putting in small bits of six or seven different things, such as oak, sallow, birch, bedstraw, chickweed and dandelion (the food of allied species in some degree guiding one's selection); in a few hours, except perhaps in the case of some aristocrats who are squeamishly select, sundry little holes and notches will appear in the object of their choice, and their owner's feverish anxiety may begin to subside. It is a guess of mine that most of the unknown larvæ feed on low plants, for were they to be found on shrubs or trees they would have been dislodged thence before now by some energetic collector.

Below is a list of the species about which I have at present any remarks to offer; but, before I stop my pen, I wish to be allowed—as a "mere collector"—to give a shove to the movement now on foot, towards giving us improved descriptions.

While some species seem fixed to one type, for others it is not enough to describe,—not to say a *single* larva,—but any number of individuals, if belonging to the same brood; and in others again

locality appears to cause a good deal of variation; hence probably arises the inaccuracy to be seen in descriptions which come to us stamped with the authority of great names. On the other hand, notes made by detached entomologists on single species sometimes fail in defining what they intend from want of more extended knowledge in the writers, for much of the value of a description depends on its being made with an eye to allied species. For instance, in a great many loopers, one finds the following pattern prevail:—a row of six dorsal markings from fifth to tenth segment (the four middle ones being best defined and coloured, and the first and last more indistinct), running into continuous parallel lines on the front segments, and contracting into a line, or being repeated with fainter outlines and more stunted proportions, on the hinder segments; and it is easy to understand how, where the colouring is not very different, a curtailed description of one species may be made to suit two or three others.

But here I had better stop, and say no more than that I for one should be very glad if any one, competent to do so, would publish a few hints on word-painting as applied to larvæ, giving perhaps some headings, under which the different parts of the description might come; future discoveries might, in that case, be more satisfactorily chronicled than the two or three unfortunate "unknowns" upon whom I have "tried my 'prentice hand."

O.* *Smerinthus Tiliæ.* All the pupæ which produced the parent moths were dug at elms, yet the larvæ fed up twice as fast on lime as on elm. What makes the larvæ of large species so apt to sicken and die off, apparently without cause? All three species of Smerinthus, as well as Cerura vinula, have served me in this way, whilst I have reared brood after brood of small things without losing a single larva.

Chærocampa Elpenor. This year I was introduced for the first time to the green variety of this larva—a much handsomer fellow than his dingy brother. I noticed that a pupa in one of my cages worked itself out of its loose cocoon, and lay quite bare on the moss for six or seven weeks before the appearance of the perfect insect. This can hardly be its habit naturally?

Cossus ligniperda. The following dates seem to confirm the notion

* O. prefixed to the name of a species indicates that it has been bred from the egg.

that the time passed in the larva state is two years: October 29, 1857, I found in an oak tree several larvæ an inch and a quarter long, but, despairing of being able to keep them alive, I left them where they were; September 22, 1858, I visited the same tree, and found, in exactly the same part of it, several larvæ nearly full grown, being (as I suppose) the same I had seen in a juvenile stage eleven months before: I now boxed six or seven, kept them in sawdust through the winter, and on examining their cage some time last spring found the cocoons contained pupæ. Again, early in August, 1859, I found in the same tree some little larvæ about three quarters of an inch long—just big enough to have been hatched six or seven weeks previously, and to grow in a month or two to the size of those I found in October, 1857.

O. *Dicranura vinula.* Three larvæ, which I succeeded in rearing out of a small family of six, differed from the figures and descriptions I have seen in having on the eighth segment, the dark dorsal stripe running down in an elongated patch far below the spiracles, though not enclosing either of them, to the middle of the second proleg; and on the ninth a smaller and more irregular patch formed by an offshoot from the white border of the dorsal stripe, and enclosing two dark spots. Another larva, captured when just about to spin, gave me an opportunity of admiring the 'cuteness of some pirate of an ichneumon; she had arranged from fifteen to twenty eggs in little irregular rows in the folds between the third, fourth, fifth and sixth segments, just where poor "Puss" could not touch them, and where they were completely hidden when it contracted itself in fear or repose; so well were they hidden that it was with very geeat difficulty that I succeeded, after many attempts, in picking them off with a pair of pincers. These eggs were black, and the little white maggots in them had just begun to poke out their heads, ready to begin operations as soon as their victim should have thatched them in for the winter.

Notodonta camelina. A pupa dug in the winter did not produce the moth till late in July, though, in the same box, Drymonia dodonæa and Peridea trepida came out on May 14th, 15th and 16th. A larva, taken from a hazel-bush, assumed a pale lilac tint at its last moult, with a darker dorsal line of the same colour.

O. *Cilix spinula.* This funny little larva seems to be very stationary during the first half of its life, eating away the upper skin only of the hawthorn-leaf on which it is located, and accumulating a little heap of frass, something like that to be seen in the mines of some of the Micros.

Nonagria Typhæ. The pupæ occurred in vast numbers this summer in some railway cuttings in my neighbourhood; in fact, it was hard to find a plant of Typha not tenanted by one of them. It appears to me that the larvæ — unless they leave the leaf-stem in which they have been feeding to spin up in an old mace-stem—make their cocoon in their mine just below the point where the flags begin to spread apart from one another; by cutting out, therefore, seven or eight inches of the flag-stem at this part the pupæ may be collected rapidly and safely, without the trouble or risk of opening the flags to see where they are; and by being kept in their cocoons they are preserved from the danger of drying up: I lost but three out of twenty-four; that is, only one in eight—a very small proportion.

Agrotis Ripæ. From twenty to thirty larvæ, collected on sand-hills in September, 1858, I bred on the 10th of June, 1859, a single Agrotis, which proved to be a fine dark variety of this species. Why the rest died is a puzzle, for they were kept out of doors in a large pot full of sand, and fed on growing plants of hound's tongue, the food on which they were found; however, as A. valligera and A. Tritici, though captured in May and kept in sand, and fed on growing plants, lose three-fourths of their numbers before the perfect insects appear in August and September, I suppose this dying off is a family failing. The larva from which A. Ripæ came may be thus described:— Ground-colour very variable, from a light pea-green to a yellowish gray (one larva I noticed, which, like Richard the Second's fops, rejoiced in being green for half his length and gray the other half); dorsal line a deep tint of the ground-colour, enclosing a very thin light line; three fine waved subdorsal lines, not quite so dark as the dorsal, and placed close together just above the spiracles; spiracles black, and placed in a band rather darker than the ground-colour; spots dark and shining; head and plate of second segment pale brown. I think some of these larvæ hybernate in the sand at a depth of several inches; they give over feeding by the end of October.

Dianthœcia carpophaga. This larva, which those who have gardens can feed on the seeds of rose campion (*Lychnis Cœli-rosa?*), has swarmed this summer; one could not a pick a dozen flowers of Silene inflata without finding their traces, and from one little patch I shook out scores of them, mixed with D. Cucubali, D. capsincola and Eupithecia venosata.

Dianthœcia Cucubali. Must be partially double-brooded; I bred the perfect insect in June, 1859, from larvæ taken in September, 1858, and again on the 24th of July, from larvæ taken on the 6th of the same

month. The larva certainly does not from choice eat the seeds of the Silene when ripe and hard, but descends to feed on the leaves, and may be found hidden under the plant, and not, like its allies, in the capsules.

Angerona prunaria. Three or four larvæ, beaten from hazel and mountain-ash, were for a time a great puzzle: their colour agreed pretty well with the descriptions of this species, but the dorsal humps did not; especially that on the ninth segment, instead of being merely bifid, was adorned with two long slender horns—curved backwards, and this made me fancy they might belong to the next species.

O. *Pericallia syringaria.* These larvæ, which I have now hybernating small, on privet, are most wonderful creatures; afflicted from their birth with a most dreadful rheumatism or curvature of the spine, whether eating, resting or moving, they preserve (as far as my observation goes) pretty much the position represented by Hübner's figure, copied in Plate 60 of Humphrey and Westwood. Other tree-feeding loopers amuse themselves during their younger days by swinging at the end of silken cords, stiff and straight as pokers; P. syringaria swings; but still keeps its nose and heels in close contact, thus combining something of the amusement of the low-feeders, who love to twist themselves into notes of interrogation, figures of 2 and capital Qs.

Amphydasis betularia. I have seen three or four specimens of the green variety of this larva, all of which had a pink dorsal line, and the humps and spiracles of an orange colour.

O. *Hemerophila abruptaria.* Undoubtedly double-brooded! From eggs laid in May I bred the perfect insect in August! Perhaps it would be as well to mention that at the time these later moths appeared some of the produce of the very same batch of eggs were still feeding as larvæ, though hatched at the same time and treated in exactly the same way as their precocious brethren, one of whom awaits with them the coming of next spring in the pupa state: I noticed that the slow feeders attained a much greater size than the fast ones, and expect to breed larger moths from them. When first hatched these larvæ have a beautiful purple stripe on the back, but they soon lose it.

O. *Acidalia imitaria.* Two or three loopers hatched from I know not what eggs in August, 1858, produced A. imitaria on the 1st of July, 1859. They fed on groundsel, and though at last they grew to a great length they were more than ten months about it. Having kept them out-doors, and so out of sight, I forgot to make a description till they had begun to spin, so I cannot speak as precisely as I could wish;

however, I know they were exceedingly long and thin, of an ochreous-gray ground-colour, and streaked and clouded with a little dusky black at the segmental divisions and along the sides.

O. *Bradyepetes amataria.* A brood, hatched on the 7th of July, fed away so rapidly for about a fortnight on dock, that I hoped to see the moths appear in August; however, upon attaining about two-fifths of their full-size they suddenly ceased eating, and are now hybernating in most obstinate abstinence. I took the perfect insect again out-doors on the 11th of August.

O. *Corycia temerata.* I mention this species only to notice the neat way in which the female laid her eggs along the ribs on the under side of the sloe-leaf, which I gave her, instead of scattering them all over it, as many moths would do.

O. *Larentia olivata.* As some of the summer species indulge sometimes in an autumn brood, so I am half-inclined to suspect does L. olivata appear before its usual time in August; at all events I took it in good condition this summer at the end of May or beginning of June; but perhaps this has been, on account of the great heat, an exceptional season. Larvæ, hatched on the 30th of August, are now hybernating small on Galium Mollugo. As far as I can see at present they much resemble the next species, both in habits and appearance, having been red when first hatched, and since become very much wrinkled and dingy-coloured.

O. *L. pectinitaria.* That this larva is not so well known as the abundance of the perfect insect would lead one to expect need not be wondered at: it is such a sluggish creature, and so fond of hiding at the roots of its food, that I should think scarcely any one who has not taken the trouble to breed it can have seen it: some I had given me by a friend, who has helped me in the following description, would remain motionless, as if dead, for hours; in fact, I never once saw them move, though I watched them often. When first hatched they are bright red, but soon become dingy; when full-grown they are short, stout and wrinkled, with small black tubercles emitting bristles; ground-colour a dingy olive-brown, with a dark interrupted dorsal line, from the fifth to the tenth segment a row of reddish V-like marks, having the angle towards the head, and the side lines reaching almost to the spiracles; from the tenth segment to the tail is a broad stone-coloured stripe; subdorsal line light and wavy; belly fawn-colour, with dark patches above the feet. Will eat Galium mollugo, and has also been reared on G. saxatile.

O. *Eupithecia pumilata.* After two or three unsuccessful attempts to rear this species on Convolvulus Sepium and C. arvensis, I luckily tried a brood with Clematis flowers, on which they throve wonderfully; they must, however, eat other things, as the moth appears throughout nearly half the year; one was brought me from the lamps on the 22nd of November, evidently just fresh from the pupa. The larva when first hatched is bright orange, with a dark head, and the very smallest creature in the shape of a Maskel—not belonging to a Micro—that I am acquainted with.

O. *Melanthia ocellata.* This larva is remarkable for having the dorsal markings repeated on the belly, though with this difference—that the six Vs on the back are formed with whitish lines, and have the angle pointing towards the tail, while the ventral Vs are red and point towards the head.

O. *Melanippe procellata.* This larva is the largest of the genus, and very difficult indeed to describe. In figure it is long, and tapers towards the head; ground-colour pale yellowish brown, paler in the last four segments; dorsal line black, interrupted at the segmental divisions from the fourth to the tenth with a reddish dash followed by a black dot, and terminating at the tail in a dark spot; subdorsal lines dingy brown and rather diffuse, almost touching the dorsal line on the middle segments, but receding again at the segmental divisions, and thus leaving a pale space around the black dots they become lighter on the posterior segments; there are two or three brownish wavy lateral lines, becoming more clouded from the sixth to the ninth segment, where they quite run into one another, but after that become at once paler and thinner; spiracles black in a white ring; there is a dark dash above each leg. Some larvæ are much darker than others, and have all the lines quite black and much clouded, so as to allow very little of the ground-colour to appear. The brood I had were hatched on the 22nd of August, full grown in a month, and fed on young shoots of the garden Clematis.

O. *M. unangulata.* Of this species I have seen five or six broods, and have so far found the larva not to vary very much. In shape it tapers slightly towards the head: the ground is of a pale stone-colour; there is no regular dorsal line, but a series of dusky dashes and dots, and at the five middle segmental divions these dots become enlarged and quite black in colour, and are preceded by an oblong transverse reddish mark, and that again by a square white spot; there are two very wavy and diffused subdorsal lines of a very faint dusky black, but just above the spiracles is a pretty clear thin line of the ground-colour,

followed by another of the darker tint; the spiracles are black; the belly of the ground-colour, only more yellowish, and marked on each side at the five middle segmental divisions with little groups of fine black dashes and dots. It thrives well on chickweed (*Alsine media*), being full fed in somewhat less than a month. Whether the moth appears again out-of-doors in the autumn I cannot say, but I bred two or three in my flower-pot about the 20th of August, in the same way autumnal specimens of M. rivata and Anticlea rubidata have been bred in-doors, though I have never seen them on the wing out-of-doors at that time.

O. *M. fluctuata.* One day in July I found, together with six or seven of the (to me common) brown and gray variety of this larva, one that was quite green all over, but with sufficient indications of the dorsal pattern to make me think it was of the same species, as in time it proved to be; I mentioned the circumstance to one of our great men, and was informed that he had never seen any but green larvæ of M. fluctuata; this set me breeding all I could, but out of six or seven broods — certainly not large ones — I succeeded in obtaining but one green larva, which on passing its last moult appeared with a dorsal line of two tints of red, but grew gradually less brilliant, until just before spinning it showed no red at all.

O. *Camptogramma fluviata.* The following dates may prove of interest: a female laid me a batch of eggs on the 27th of July, from which I bred the moths from the 1st to the 10th of September; all their transformations having been passed in an average time of forty days. On the 22nd of August I procured eggs from another female, the moths from which appeared from the 8th to the 11th of October, having thus taken on an average seven or eight days more than the former brood to go through their changes. Since then I have been told of a brood hatched in October, which passed six weeks in the larva state alone, and from which at the time I am writing (December 9th) no perfect insects have yet appeared; also of another brood of larvæ, hatched in November, which are still very small, and feeding but slowly. Most of the captured specimens of the moth itself that have come under my notice have occurred near low ground, but I cannot think it an exclusively marsh insect, for both the egg-laying females and the larvæ (next season I hope to be able to give the proper name of the food-plant) have been found on the sides of hills, at a considerable elevation above any water. Some of the females have on the fore-wings a dash along the costa, three or four waved strigæ, and the ring round the dark spot — all of the ground-colour of

the male's wings and some of the latter have a grayish ring round the central spot; the dark central band in both sexes is liable to be interrupted, and indeed to be much diminished in extent every way, sometimes appearing as two thin irregular dashes or streaks.

O. *Cidaria picata.* I have found this larva almost a tougher subject for description than Melanippe procellata, but must try my best: the ground is of a pale stone-colour, segmental divisions reddish; no dorsal line, but a dark blackish patch on each segment, increasing in size and depth of tint up to the ninth, where it attains its maximum, none on the last four segments; subdorsal stripes dusky, very much freckled and diffused, and forming four small dark dots at the corners of the dorsal patches; just above the spiracles is an irregular dusky stripe enclosing a thin wavy line of the ground-colour, bordered with black; spiracles black; belly marked on each side at the segmental divisions with groups of small black spots. Thrives fast on chickweed, though I must confess I half expected to find it attack the leaves of some tree or shrub.

O. *C. corylata.* Two or three larvæ, hatched on the 22nd of June, fed up on the small-leafed sloe, and went to earth on the 2nd of October, having grown so very slowly that for a long time I fancied—especially as they did not appear at all unhealthy—that they would hybernate. They did not quite agree with the descriptions I have read, but had the ground-colour of a yellowish green; subdorsal stripe greenish yellow; on the third to the fifth segment, and again on the eleventh to the tail a dark reddish brown dorsal stripe; on each of the intermediate segments four very fine brown dots arranged in pairs, with a fine dash on each segment and at each segmental division; spiracles white, the middle ones having between them a row of four brown spots; belly sprinkled with very fine brown dots arranged in lines.

C. pyraliata. A rather slender pale green looper, with yellowish segmental divisions, and a broad dark green dorsal line, bordered on each side with yellow, which I found in spring feeding on cleavers (*Galium Aparine*) produced this species, and I know it has also been both reared and taken on Galium mollugo. Query, Is Albin, as quoted by the 'Manual,' right in giving whitethorn as the food? though I suppose it is certain that Eupithecia vulgata feeds on flowers of ragwort, &c., as well as on hawthorn.

O. *Eubolia cervinata.* A small batch of eggs, laid October 14, 1858, and kept together through the winter, were hatched at various intervals between April 10th and May 30th, 1859, some of the larvæ having been six months and others seven months and a half in the

egg; however, the perfect insect did not show so much variation in the time of their appearing.

Eupithecia expallidata bred from the Golden-rod, &c.—It may interest Mr. M'Lachlan to know that three years since I bred seven specimens of Eupithecia expallidata from mixed larvæ beaten from Solidago virgaurea, Senecio Jacobæa and Achillæa millefolium. I have little doubt that the first-named flower is the ordinary food-plant. Last autumn I again met with what I believe to be the larva, and took accurate descriptions, which, should my suspicion prove correct, I hope, ere long, to give the readers of the 'Zoologist.'—*H. Harpur Crewe; Wickham Market, Suffolk, March* 31, 1860.

Description of the Larva and Pupa of Sarrothripa Revayana.—I have bred this from a dark green larva, with long very fine white hairs. It has but little or no resemblance to any Tortrix larva with which I am acquainted. The pupa is bright green, with a broad black line down the centre of the back; it spun a white silken cocoon between two leaves of oak upon which the larva fed.—*William Machin; 35, William Street, Globe Fields, Mile End, March* 26, 1860.

A List of Micro-Lepidoptera, of which the Transformations are unknown. By Charles Miller, Esq.

The following list I had prepared for my own use, but it having occurred to me that it might prove useful to my fellow entomologists in the coming campaign I am induced to publish it for their benefit, through the medium of the 'Zoologist.'

It will be observed that beside those species of which the transformations are entirely unknown I have included those of which the habits are as yet imperfectly worked out, and also those which have been discovered in the larva state on the Continent, but not yet noticed in the same stage here. With regard to these latter species, I have introduced them because it may possibly happen that their food in this country is not the same as that which they affect abroad.

I have also accompanied most of the species with a few remarks, the result of my own experience with them. Meagre though such scraps of information be, they may nevertheless prove useful in confirmation, and taken in conjunction with the observation of others.

A slight glance at the list will immediately suggest that much remains to be done before the veil of obscurity which hangs over the habits of these species can be removed.

It is very evident that we have got through the easiest part of our task in investigating the habits of the Micro-Lepidoptera, and that the elucidation of the remainder will be proportionably difficult. As an example of what has been accomplished we may refer to the four very natural genera — Coleophora, Elachista, Lithocolletis and Nepticula. In investigating the transformations of these we have positive information respecting part of the species which we can safely apply in our researches into the economy of the rest, and our labours are rendered comparatively light. Thus we know that a Coleophora larva is a case-bearer, and feeds on the seeds and leaves of plants, making conspicuous blotches on the latter; that an Elachista mines long white galleries in the leaves of grasses; that a Lithocolletis feeds on the parenchyma of the leaves of trees and shrubs, contracting the cuticle in a manner peculiar to itself; and that a Nepticula makes a long narrow contorted mine; and accordingly we are guided by such information in our search. But there are many genera of which we know little or nothing concerning their habits, and that little is calculated to lead us astray rather than aid us, and many again are so rare that we can make only the most remote guesses at their economy. Others there are which feed in decayed wood, and present us with no sign by which we may recognise their presence, and some, as with the genus Gelechia, feed in every conceivable manner, and make a similarity of habit the exception instead of the rule.

These are some of the difficulties which we must be prepared to encounter at every step, and therefore I think that all information, however slight it may appear, is worthy of being recorded, as it may at some time or other serve to form a connecting link in our chain of knowledge.

Talæporia pubicornis.

Diplodoma marginepunctella. The larvæ of this species are occasionally met with on old palings, and have been found to have a carnivorous propensity. Whether this is their usual mode of feeding or whether they are in reality lichen-feeders is not thoroughly decided. Perhaps they like a change of diet.

Ochsenheimeria bisontella. Judging from analogy one would suppose this species, like O. Birdella, would feed in the stems of grass, but in the spot where I am accustomed to take it commonly the only grass to be found is the mat grass (*Nardus stricta*). It may feed in this, but the hard roots seem scarcely suitable for a tender Micro-Lepidopterous larva. I recently examined a large quantity of this plant but found no trace of larvæ.

Tinea imella.

T. ferruginella. I have beaten the perfect insect out of hedges, and Mr. Scott found it plentifully in a coal mine: the larvæ probably feed both in rotten wood and Fungi.

T. Monachella, T. picarella, T. ruricolella, T. cochylidella, T. albipunctella, T. merdella, T. flavescentella, T. simplicella, T. subammanella.

Lampronia Luzella. Can this feed in the shoots of bramble?

Incurvaria tenuicornis.

Nemophora Schwarziella. Now that we know the habits of one of the species (Swammerdamella) we should not have much difficulty in working out the history of the remainder. No doubt they feed in cases on low-growing plants, and should be searched for in open places in woods where the imago occurs. I once found N. Metaxella plentiful in a clearing, flying at dusk a short distance from the ground; the prevailing herbage was primroses and wild strawberries. They should be feeding at the present time.

Adela rufimitrella. It is evidently the habit of the larva of this and the preceding genus to winter in the larva state in cases, and complete their feeding in the early spring. Both in this and the following genus the female has a very elongated abdomen, well suited for penetrating the corolla of a flower, and it will no doubt be found that they lay their eggs at the bottom, that the young larva when hatched makes its way into the seeds, and feeding there until it has attained a certain growth quits its temporary abode, and constructing a case feeds upon low growing plants through the summer and autumn, winters and completes its feeding in the spring. On the Continent the larva of this species has been found in cases under fallen leaves. I have taken all my specimens in the perfect state on the flowers of the Erysimum alliaria. It is generally supposed to be attached to the Cardamine pratensis.

A. Sulzella. This I have also taken from the blossoms of the Erysimum. Can it have a similar habit to the preceding species?

A. viridella. This is one of our "difficulties." The insect is generally common, but yet eludes all our endeavours to discover its economy; its habit of flying round the branches of oaks may possibly have nothing to do with its mode of feeding, yet Mr. Stainton has observed the females apparently in the act of laying their eggs on the midribs of oak leaves.

A. cuprella. Our knowledge of the habits of this species is very scanty: we know that it frequents the catkins of blooming sallows,

but these are most attractive to insects generally, and whether the young larvæ feed therein is a point which time will decide.

Nemotois scabiosella. With so close a natural connection between this and the preceding genus we may reasonably suppose a similarity of habit in the preparatory stages. N. scabiosella has been observed lying with expanded wings on the blossoms of the Scabiosa columbaria, her abdomen thrust among the florets as if performing the operation of laying her eggs.

N. cupriacellus. I have found on the same plant, and also obtained by sweeping amongst papilionaceous flowers.

N. fasciellus. Though exceedingly partial to the blossoms of the elder, I have taken them from the flowers of the thistle. I have also taken them apparently at rest on the leaves of elder and nettles.

N. minimellus. I have also obtained by sweeping amongst papilionaceous flowers.

Micropteryx calthella, M. aruncella, M. Seppella, M. mansuetella, M. allionella, M. Thunbergella, M. purpurella, M. salopiella, M. semipurpurella, M. unimaculella, M. Sparmannella and M. subpurpurella. We are still quite in the dark as to the mode of feeding of the species composing this genus. True M. unimaculella has been bred from pupæ found in small mines in the lichen and bark of birches, but more than this nothing is known. Some of the smaller species frequent flowers; thus, M. calthella is common on the blossoms of the Ranunculaceæ, M. Seppella as abundant on the Veronica Chamædrys. All are early in their appearance, and as the eggs must be deposited in the spring, and they are but single brooded, it would appear that these little creatures take a year to perfect their transformations. Can they be larvæ for so long a period, and where do they exist; in the stems and leaves of the plants they affect?

Swammerdamia lutarea.

Chalybe pyrausta.

Eidophasia Messingiella.

Plutella annulatella. Probably feeds on one of the Cruciferæ, like the other species of the genus.

Cerostoma sequella. Reputed to feed on lime and sallow, in May and June.

C. alpella. Occurs in the perfect state amongst oaks and hornbeams.

Exæretia Allisella. Supposed to frequent the Artemisia vulgaris in the perfect state. The larvæ should be looked for in May and June.

Depressaria bipunctosa.

D. ciniflonella. Can this feed in the shoots of fir trees?

D. Yeatiana.

D. granulosella. I once bred a specimen of this from larvæ collected in July, at Deal, from a dwarf umbelliferous flower.

D. Douglasella. Has been bred from one of the Umbelliferæ, but wants further investigation.

D. badiella.

D. pastinacella. Whence the name of this species? One would suppose it to feed on the Pastinaca sativa.

Gelechia cinerella, G. inornatella.

G. gerronella. This has a singular partiality for the common fern. The larvæ should be looked for in May and June.

G. vilella.

G. nigra. This should feed on the white poplar in May.

G. fumatella.

G. ericetella. A common species amongst heather.

G. divisella, G. palustrella.

G. peliella. Feeds on the Continent on Rumex acetosella.

G. longicornis.

G. terrella. Another of our difficulties. The insect swarms on every common and in every piece of waste ground, and yet the larva remains unknown. Mr. Douglas found several Gelechia-like larvæ in March, amongst moss, whilst searching for beetles; these were supposed to be the long sought for G. terrella, but none were reared, and Mr. Scott found it in a breeding-cage which contained a bunch of rushes.

G. desertella, G. politella.

G. senectella. This is another common species amongst fern. The larva should feed in May and June.

G. mundella. Has been bred from moss, but the larva not proved to have fed thereon.

G. boreella, G. galbanella, G. basaltinella, G. humeralis, G. Æthiops, G. distinctella, G. solutella, G. celerella, G. maculiferella, G. junctella, G. vicinella, G. Hübneri, G. littorella, G. aleella, G. albiceps.

G. tenebrella. Bred from moss, but the larva not observed.

G. tenebrosella, G. Sircomella, G. immaculatella, G. nigritella, G. atrella, G. suffusella, G. lucidella, G. lutulentella, G. gemmella, G. subdecurtella.

Parasia neuropterella. Most likely feeds in the seeds of one of

the Compositæ, in conformity with the habit of the other species of the genus.

Cleodora cytisella. The perfect insect always occurs amongst fern. It has been suggested that as C. striatella feeds in the stems of the tansy, this may also affect the Pteris aquilina in a like manner.

Chelaria Hubnerella. Said to frequent poplars in the perfect state. I have never noticed this habit, but have met with it commonly amongst birch and hornbeam.

Aplota palpella. A continental species has been bred from rotten wood; this may have a similar habit.

Sophronia parenthesella. Occurs amongst broom. Can it be an internal feeder?

Pleurota bicostella. A common species on heaths. The food-plant of the larva is a mystery.

Harpella Geoffrella. From the habits of the other species of the genus we may safely conjecture that this feeds in decayed wood.

Hypercallia Christiernana. Feeds on the Continent on Polygala Chamæbuxus: this is not a British plant, but it has its representative in another species, P. vulgaris. The insect is so rare here that it would well repay us to find the larva. It should be searched for in May.

Dasycera Oliviella. The larva no doubt feeds in decayed oaks, which trees the perfect insects frequent.

Œcophora tripuncta. Supposed to frequent brambles.

Œ. Woodiella. Very scarce, and nothing as to its habits known.

Œ. grandis. Has been taken in hedges "composed of living and dead hazel and birch," in which most probably the larvæ feed.

Œ. formosella. Another rarity, and we may have to wait long before its transformations are discovered.

Œ. lunaris, Œ. lambdella, Œ. subaquilea, Œ. Panzerella, Œ. tinctella, Œ. fuscescens. Like most of the genus these are no doubt decayed wood feeders.

Œcogenia quadripuncta.

Butalis fusco-cuprea, B. cicadella, B. variella, B. incongruella. All the larvæ have probably the same habit, namely, that of living in webs upon their food-plant.

Atemelia torquatella.

Pancalia Leuwenhoekella, P. Latreillella. As a rule those species of the Tineina which feed internally are more or less brightly coloured. Wood feeders are brilliant in their markings, but destitute of the spots and bands of gold that distinguish the miners in leaves. Now as the

latter characteristic is abundantly presented by the two species of this genus, we may reasonably conjecture that they inhabit the interior of leaves in the larva state. P. Leuwenhoekella is a very early insect; I have taken it on the 22nd of April. I have fancied it attached to the rock rose. Singular it is that wherever I take the species there is the Helianthemum. Most probably it feeds up in the autumn, but as the above plant is almost an evergreen it might be worth while searching for the larvæ now.

Acrolepia perlepidella, A. betulella.

Röslerstammia Erxlebella. Frequents heather and lime trees in the perfect state, and reported to feed on the same, but the point wants further elucidation.

R. pronubella.

Glyphipteryx fuscoviridella, G. Thrasonella, G. cladiella, G. oculatella, G. Fischeriella. The first of these is a common insect in damp places on heaths, flying amongst the short grass. G. Thrasonella partial to rushes, perhaps feeds in the stems. G. Fischeriella frequents blossoms indiscriminately, and affords us no clew to its habits.

Æchmia dentella.

Tinagma sericiellum, T. stanneellum. Both species seem attached to the oak, and the larvæ no doubt have a similar habit to T. resplendellum.

Argyresthia semitestacella, A. spiniella, A. semifusca.

A. retinella. In the shoots of birches in May and June?

A. abdominalis. In the shoots of juniper in May and June?

A. Andereggiella. In the shoots of wild apple in May and June?

A. præcocella. In the shoots of Juniper?

Zelleria heparіella. Bred by Mr. Stainton, but the larva not observed.

Z. insignipennella, Z. fasciapennella.

Gracilaria stramineella, G. hemidactylella, G. falconipennella, G. imperialella.

Coriscium sulphurellum.

Ornix devoniella.

Coleophora olivaceella.

C. orbitella. Has been bred from a case found on the stem of a birch tree, but whether the larvæ fed on the leaves of the same remains to be proved

Coleophora deauratella, C. Fabriciella, C. vulnerariæ, C. niveicostella, C. apicella, C. squamosella.

Stathmopoda pedella.

Cosmopteryx Lienigiella.

Batrachedra pinicolella.

Chauliodus insecurellus. Probably feeds on one of the Umbelliferæ.

Laverna Stephensi, L. decorella, L. subbistrigella, L. rhamniella.

Chrysoclista bimaculella.

C. flavicaput. I have an idea that this feeds in decayed hawthorn stumps.

Asychna modestella. Another difficulty. A very abundant insect where it occurs, on the flowers of the stitchwort, but like some other species this habit may have nothing to do with the food of the larva. It is difficult, however, to disconnect the plant and insect one from another. It is also supposed to frequent oaks.

Elachista apicipunctella, E. flavicomella, E. Holdenella, E. stabilella, E. humilis, E. consortella, E. obliquella, E. cingillella, E. serricornis, E. collitella, E. dispunctella, E. ochreella. These are all most probably grass feeders, and a few seasons will no doubt put us in possession of their complete history.

Lithocolletis nigrescentella, L. triguttella, L. scopariella, L. ulicicolella. Four species of which very little is known; the two first are unique. L. scopariella is supposed to feed on the broom, and Mr. Stainton suggests April and May as the feeding-time of the larvæ.

Opostega salaciella, O. auritella, O. crepusculella, O. spatulella. All the species frequent damp places amongst grass. O. salaciella I have found repeatedly after the usual time of flight sitting on broom twigs.

Nepticula intimella, N. headleyella, N. apicella, N. sericopeza, N. quinquella. Time and perseverance will work out the history of these entomological atoms.

Trifurcula atrifrontella, T. squamosella, T. immundella. I have an indistinct remembrance of noticing a mine similar to that of T. pulverosella in the leaves of broom. This may be T. immundella.

Bohemannia quadrimaculella.

CHARLES MILLER.

March 14, 1860.

Notes on the more common Species of the Genus Bombus.
By Col. H. W. Newman.

Bombus subterraneus. The female is nearly ten lines in length; the male between six and seven lines; and the worker nearly six lines, but varies very much in size. This bee is very numerous throughout England and Scotland: it builds its nest deeper than any other of the genus, generally a foot to eighteen inches under ground, and, on this account, is difficult to get at. I mistook this bee for the Bombus Hortorum for some years, until I became better acquainted with it. It is to be found in meadows, especially among drains and in banks. The number of individuals in one nest varies from ten to fifty, but is generally between ten and thirty only. The male is very like the worker, except in being more uniform in size, in having longer antennæ, and in being more hairy towards the anus, and the abdomen not so sharp pointed. This was the first bee of the genus in which I discovered the freaks of the drones. The males of this species fly very near the ground, and with a short dodging flight. On fine days, after leaving the nest, they amuse themselves in flying from place to place at short distances, paying visits to tufts of grass, to holes in the ground, to banks, ditches, walls, &c., and these rounds of visits are continued to the same spots on warm days for several hours, that is, between 9 A.M. and 2 P.M. I mentioned these movements to my friend Mr. W. H. L. Wallcott, of Clifton, who imagines these males have never been mated with the young queens. Males, females and workers fly near the ground, and the males have a more unsteady flight than the workers. I have both watched and taken many nests of this bee, and have never seen a male return to the nest, nor do the males make any observations when leaving the nest, as is the case with the worker. This species is not pugnacious or irritable; I have never been attacked by them when taking their combs; indeed, bees of this genus only become irascible in proportion to their numbers. Bombus subterraneus prefers the larger flowers, such as the foxglove, dead nettle, snapdragon, and other similar sized flowers. It is very late before the queens make their appearance in the spring. The males may be seen in great numbers, in September in a dormant state, on the common thistle blossoms in cool showery weather.

I have never found the black cuckoo bee (*Apathus rupestris*); I have taken the nests of this bee, but the queens of this species are generally infested with Acari, which attach themselves to the body of the bee,

about the junction of the thorax and abdomen. This bee shows great instinct in its search after honey: in those blossoms which it cannot reach inside it goes to the bottom of the flower outside and penetrates the part where the nectary lies.

Bombus lapidarius (redtailed bee). This is not only a large and very handsome species, but is one of the most interesting of the genus. It makes its nest in old walls, heaps of stones, and dry stony banks. At Aberystwith I found a nest on the top of the hill to the left as you face the sea; it was nearly two feet from the surface of the ground to the combs, and contained about two hundred and eighty workers, and the combs contained about fifty males and twenty females unhatched. I have never seen any of the males of this species re-enter the nests; they make their appearance much later than many of their congeners, but are easily distinguished from the workers by their beautiful gay liveries of buff and red—a little in the parroquet style of ornament. Generally speaking they seldom give much trouble in digging out when in the ground, being near the surface; the nest at Aberystwith was therefore unlike any other of this species I ever saw. The workers are not very pugnacious so far as I have found them, but are extremely active in gathering honey. The flight of these bees is very steady, and at a moderate distance from the ground. The males go their rounds in fine weather, and are to be found frequenting the smaller thistles, Veronica, &c.

B. Derhamellus. This bee is so like B. lapidarius that it is mistaken by many for that species, but the discerning eye of the illustrious Ray pointed out the difference many years ago. It builds its nest in meadows and pastures, the grassy parts of lawns of gentlemen's houses, and is in this respect like the moss carder (*B. Muscorum*). The flight is much higher in this species than in the moss carder. I have taken many of their nests. In August, 1857, I captured a whole nest on one of the little knolls near the sea at Llandudno, N. Wales. The workers were very pugnacious, more so than ever I saw them; the heat at the time was 82° Fahr. in the shade. The male of the B. Derhamellus is quite different in appearance from that of the B. lapidarius, being quite black, except the tail, and like the worker, but males and workers are at once to be distinguished by the difference of the antennæ. Although I have observed the Bombi in Scotland a good deal, when visiting that country, yet I never saw either the B. Derham ellus or B. lapidarius in any part of that country. I have taken several nests in that country of bees which inhabit walls, generally old ones, but, although they have a red tail, the yellow band on the collar

and black body evidently mark them as a different species from either of those I have been describing.

B. Hortorum. This species is very common, but generally in small communities, numbering from ten to fifty. It is very similar to B. subterraneus, especially the females. Their flight is of the same dodging jerking order as the latter bee, but their nests are generally near the bottoms and lower parts of old garden walls: the great Linneus has given them the right name; indeed all the Bombi have been admirably named by that great naturalist, in allusion to their habits. The nests of B. Hortorum are seldom far under ground; the few that I have met in the open garden walks are not more than six inches, and they are very apt to be destroyed by the field mice. I have had two nests in different gardens, but never noticed any males issue from them. They fly near the ground like B. subterraneus, but on the whole are not so interesting as several of the others. They abound all over the kingdom. I have had less experience in handling these than any of the others enumerated by me; if the males even return once to the nest a desertion by these soon takes place: I have never watched this species so intently as I have the others, and cannot say positively as to the exact habits of the males, but presume they seldom or never return to the nest after leaving it.

B. Muscorum (moss carder, moss builder, and in Scotland, foggy). This is a most common species, building in the moss generally at a short distance from the tread of cattle, in hedge banks, &c.; the colour is a dark tawny yellow. The female is one of the latest in making her appearance in the spring, and as she prefers the larger blossoms of dead nettle, snapdragon, foxglove, and all the later wood flowers, it seems wisely ordered that her appearance should be late. I have had a great many nests of this species, and can testify that their sting is about the sharpest of any of the whole genus; this species flies near the ground; the males are a slight degree lighter in their colour. They fly low, and may be seen going their rounds in July and August, stopping at various places in the embankments, and proceeding onwards in fine weather. The individuals of this species are subject to be easily destroyed by vermin, hedgehogs, foxes, and last, though not least, by idle boys, as the nests are easily got at. My mode of capture is as follows: I remove the whole nest, bees and all, with the help of a knife or small spade, and then return it to its place; I revisit the spot after sunset and remove the nest to a box, and so capture them all. I had many nests at various times in my gardens; they work very actively for some time; I have known them do so vigorously until the middle

or end of October under straw hives. The bees and combs should have some moss placed round them. Each of the nests contains from ten to one hundred bees. I have seen them in the moors in Scotland, about the middle of August, with one old queen and only four or five workers. The moss carders are the most hardy of all the English wild bees; they will brave the wind and rain in very tempestuous weather without being benumbed as most of the other species are.

B. terrestris. The workers of this species vary exceedingly in size; some of them are very small. The males generally appear about the third week in July; the females make their appearance very early in March. This bee is extremely like its congener, B. Lucorum, in colour and appearance, and has nearly the same flight; but the males of B. terrestris are very like the workers, with a slight difference in the antennæ and the lower part of the abdomen. I dug out a nest of these insects on the tram-road on the Gloucester Road, near Cheltenham, the middle of July, 1859, containing about three hundred workers, and the combs contained about fifty males and a few queens unhatched. They worked from a box in my garden for about six weeks; a good many young queens were hatched and worked well, but the males that hatched were extremely weak, most of them unable to fly, and the few which did fly never returned to the box. The passage to the combs from the entrance of the original nest was about three feet, and the combs were about eight inches or a foot from the surface of the ground. The workers were extremely irascible and acted offensively when near the combs, fastening occasionally on my clothes, in my hair, &c. This is the only species of Bombus, the nest of which I have ever found inhabited by the great black cuckoo bee, Apathus rupestris. This species is extremely fond of the lime blossom; in a showery summer, when these blossoms are out, I have seen these bees remain on them till long after sunset, and many of them, about the end of June or beginning of July, lying dormant under these trees on the ground, as if inebriated. I have taken hundreds of their nests containing a good deal of wild honey, in different parts of England and in Scotland. The males have the same habits as those of B. Lucorum, but I never found any bee, either male or female, of the latter species, in the nest of B. terrestris. These bees are also very fond of the Dutch clover (*Trifolium repens*), and Mr. Huish denounces them as great enemies of the hive bees in consequence, but he was not aware how few of the genus interfered in their pasture with the hive bee. The difference I have always found between the flight of the males and workers when removed to a new place is this, that on letting

the captives out in the morning the males never make any observation on the new locality, but fly straight away instantly, whereas the workers come out with great caution, taking great notice of the entrance to the nest, and going farther and farther gradually from the place; this is done until they become quite acquainted with the locality.

B. Lucorum. The males of this species appear about the second week in July; the females make their appearance early in March. These bees build their nest about six inches to a foot under ground. This species is very numerous all over Great Britain; their nests are found in dry places, small woods and hedge banks; the flight of the queens is very steady, and the workers on issuing out of their nests generally ascend from thirty to forty feet in the air. This species is very numerous in July and August, often amounting to three hundred workmen and from fifty to sixty males besides the queens. They are not nearly so irascible as B. terrestris; I have taken nests of B. Lucorum very often without receiving more than one or two stings on my hand. The males are different in appearance from the workers, being nearly all over a deep buff colour, and the antennæ are a little longer as usual, but not so straight as those of the worker. I have captured hundreds of their nests, and watched them for many hours; I never saw one male return into the nests after leaving. Their flight is remarkably steady and high in the air. They are my greatest favourites of all the Bombi. There is a great similarity between these and B. terrestris both in the queens and workers, with a little more white at the tip of the abdomen, but the males are very unlike. This species is by far the most docile of about seven or eight which I have removed to my garden at various times during the last fifty years. The males amuse themselves on fine days for several hours in going their round of haunts, but different from those of B. subterraneus, as the former never fly very near the ground, but pass through hedges, bushes, shrubs and and low trees, keeping to the same places exactly in every round. This species is greatly infested with small Acari, which destroy the queens; they seldom remain during winter in the old nest, but in this there may be an exception to the general rule, for in a most populous nest which I took in Scotland, I found, in a compartment near the new combs, the remains of about three hundred more cells entire, but covered with mould, and evidently the combs of the previous year. I noticed these bees one mild autumn busy as late as the 9th of November on some flowers in my garden; they were small workers and not queens. I have also noted this bee as the earliest to commence

nidification. On the 16th of April, 1856, I observed a female issuing from a bank of the Basingstoke Canal, Aldershott, and the next day and for several following days I saw the bee return to the nest, and, on its going out, it remained generally from twenty minutes to half an hour. No workers made their appearance for six weeks. The males of this species may be found frequenting the blossoms of Salvia, Veronica, &c., from the middle of July until the beginning of September.

I have heard from a friend who lives in Lower Canada that the Bombi in that country are numerous and much more irascible than in England, probably owing to the high temperature in summer, the thermometer in June, July and August, being often at 95° in the shade for weeks together at mid-day.

The strong instinct in all these interesting insects in choosing a place for nidification is displayed in always pitching on a spot which has a natural drainage from the wet. Many of their nests are to be found on the banks of canals, rivers, dry banks in hedge rows, and even those in meadows or pastures have generally a hole or drain near the combs which prevents their nests being inundated by any sudden gush of water, or they are situated in an extremely dry and elevated spot.

H. W. Newman.

Hillside, Cheltenham.
March 29, 1860.

[It is greatly to be wished that our correspondent, who appears to have so much leisure for studying the habits of these most interesting insects, had turned his attention to making out the exact connexion between the Bombi and Apathi which reside in the same nests. In October, 1834, then a child in Entomology, I thus defined this connexion, hoping my observations would lead others to a more minute investigation; but alas! how small is the increase of our knowledge in the twenty-six years that have passed away. "Larva hatched from an egg deposited by its parent in the nests of other bees at the time when their own eggs are laid; when it hatches, being larger and stronger than the rightful possessor of the cell, it consumes the food provided for its companion, and starves it to death; and in those instances in which fresh supplies of food are daily provided, it continues to receive and appropriate them as its own. Pupa changes in the same situation, in a silken cocoon, spun by the larva. The imago has no apparatus, either on the body or legs, for collecting honey; it enters the nests of other bees with perfect familiarity, and seems to be quite unsuspected of intrusion; it collects no pollen or honey; never builds a nest of any kind, or takes any care of its young; but spends its time among flowers, or hovering about sand-banks in which other bees have fixed their habitations." Mr. Smith, in his valuable work, has objected to my assertion, that the larva of Apathus is larger and stronger than its victim, but looking at the relative size of

the perfect insects, I think probabilities are in my favour. With this single exception, I believe, the entire paragraph has remained for twenty-six years both uncomfirmed and uncontradicted.—*Edward Newman*].

The Hybernation of Wasps.—Mr. Wailes' statement respecting the queen Vespa vulgaris, found near the summit of Skiddaw is very interesting (Zool. 6941), and I think partly explained by Mr. Westwood; my solution of the matter is thus: in some seasons we often see an extraordinary number of queen wasps about the end of April, and yet in the after part of the summer very few nests, and a great—and I may say a pleasing—scarcity of workers. My opinion is that should a fortnight of wet cold weather arrive after their first appearance, many of these queens that have scarcely begun their nests, ake refuge for a time in the places alluded to by Mr. Wailes, and from the continuance of rain and cold become so benumbed that they never revive, and these are the queens which are found in hiding-places. I take great notice of the Hymenoptera; and in 1849, the appearance of the queen-wasp (and also the Bombi) in March and April was that of a most plentiful brood of these insects: but having afterwards twenty-five days of rainy weather in May, the nests in Gloucestershire have rarely been so few. I believe that two-thirds of the queen wasps which had begun or intended to begin their nests that year, perished in the month of May, as described by Mr. Wailes. Nevertheless, it is generally in a plentiful year of wall-fruit, plums and pears, that wasps are most common.—*H. W. Newman; Hillside, Cheltenham, April* 4, 1860.

British Hemiptera: a few words on them not in Scientific Language.

By Edward Newman, Memb. Imp. L.-C. Acad.

For the first time during a lengthened entomological career I hear a rumour of the British Hemiptera coming into favour. Messrs. Douglas and Scott promise us a list, or a catalogue, or some preliminary work, that is to act as a precursor to a knowledge of these hitherto neglected insects; and no sooner have we this announcement than we learn that Mr. Walker is already engaged in a similar labour. I believe that no one in England possesses a knowledge of the Hemiptera anything approaching to Mr. Walker's knowledge; and I think I may add that Messrs. Douglas and Scott do not pretend to any such knowledge, but have simply taken up the subject because no one else seemed inclined to do so. But although both these projects are now before our little entomological public, let no one suppose there will be two works on Hemiptera competing for public favour; I apprehend that the two projects will either merge in one, or that the second, should there be two, will be simply a revised, enlarged and improved

edition of the first. This last is the better course: let one mark out the ground, the others erect the building; above all things let us proceed, as Mr. Doubleday has done with the Lepidoptera, and ascertain what has been done on the continent of Europe.

But while negociations are pending, and without any idea of the views which either of our friends entertain of the methodical arrangement of these said Hemiptera, or, in common parlance, bugs, I beg to invite the attention of my younger readers to a simple mode of classification. All the Hemiptera may be divided by very simple and natural characters into four principal groups, from which I totally exclude the Aphides, and the curious genus Aleyrodes, which is not allied in any way by metamorphosis with the other Hemiptera, and also the still more extraordinary family of Thripsidæ, comprising those mischievous little insects which nibble the purple petals of our Fuchsias, and entirely spoil their appearance. These and a few more odds and ends, together with one half of what I shall presently call the "short horns," are generally associated together under the name of Homoptera. For this droll association no entomologist has clearly explained the the reason, and should my young readers try to comprehend it I promise them they will not succeed.

The first thing to observe in a Hemipterous insect is the character of the antennæ; if they are long, jointed, capable of motion, and very plainly to be seen, the insect belongs to the division which I propose to call "long horns," but if they are very short, without apparent joints, incapable of motion, and very difficult to find out, then the insect belongs to the division which I shall call "short horns:" this kind of antenna may be called the ball and bristle antenna; it generally consists of one small round joint, and one very fine, small, short, bristle sticking out of it; neither the ball nor the bristle are to be seen without a magnifying glass, and the insects really look as though they had no antennæ at all, because their antennæ are almost entirely concealed in a groove or cavity close to the eyes.

Next we will divide the "long horns:" some run about the trees and shrubs and herbs, and feed principally, but not entirely, on the sap of plants, and others run on the surface of water, and feed on minute insects. The first I propose to call "plant bugs," the second "water walkers." The "plant bugs" are really and certainly the true bugs, Cimicina, and to this group properly belongs the bed bug (*Acanthia lectularia*), which I believe in its native country is a plant or timber-sucking insect; but, transplanted into a London atmosphere, it forsakes that cooling diet, and ceases entirely to be a vegetarian. Almost every

one of these "plant bugs" emits a scent that is peculiar rather than agreeable; but the "water walkers," or Hydrometrina, have no such scent,—at least I have never discovered that they offend the olfactory organs.

The "short horns" offer an equally intelligible division into water and land insects; the water insects live actually *in* the water, and not *on* it, diving, swimming, walking and really living under water; they feed on insects, and some of them seize on a drowning fly with such intense eagerness that they will allow themselves to be dragged out of water rather than forego their meal. They are called "water boatmen" or Notonectina, which swim, and "water scorpions" or Nepina, which crawl. The land Hemiptera with short horns are called "frog-hoppers" or Cicadina, and, like the land "long horns," they feed on the sap of plants.

In collecting Hemiptera we must associate them differently, calling them "plant bugs" and water bugs;" the first and fourth divisions now come together, and the second and third divisions come together. There is no way of getting the "plant bugs" so readily as with a walking stick and umbrella; they are almost invariably found on plants, and the best plants to search are junipers, yews, larch firs, oaks and birch: spread the umbrella, turn it upside down, hold it under the boughs, and beat or shake until the insects fall in.

Now there is no racing or flying, the "long-horned plant bugs" crawl slowly and sedately up the silk or gingham, and make no attempt to escape the fingers of the entomologist as he picks them off one at a time and transfers them to his bottle of bruised laurel leaves, an indispensable implement of the bug hunter. The "short horns" require different tactics; they possess a leaping apparatus in the hind legs, which renders it very difficult to secure them; the better way, when you have one of them in your umbrella, is to close it partially, and the "frog-hopper" will, by a series of angry but ineffectual leaps, soon get to the bottom, where he will be secured without any difficulty.

When once in the laurel-bottle your captures are quite safe: the fumes of prussic acid appear to have no painful effect whatever on the imprisoned insects; they walk about with apparent unconcern, after the first minute or two exhibiting a little weakness of the joints, and at the end of five or six minutes turning on their backs and ceasing to move. This, however, is only a temporary stupor or torpor, or coma, as mesmerists would call it, for I have known them entirely wake up, recover, and attend to the ordinary occupations of life, even after passing twenty minutes in this comatose state therefore

I venture strongly to recommend that they remain in the laurel-bottle at least two days.

On taking the bugs out of the bottles there is a choice of two ways of preparing them for the cabinet, pinning or carding; mine are ancient specimens, and when they were caught I followed the ancient practice of pinning, but younger and better entomologists than myself invariably card their bugs. In case of pinning, the pin should be passed through the very centre of the scutellum, not on one side, as in beetles. Whether pinned or carded, the legs and antennæ should be neatly displayed, and two or three individuals should be set with their wings wide open, so as to exhibit their characters, and to expose the dorsal surface of the abdomen, which is often gaily coloured: two or three individuals also should be laid on their backs to exhibit the colour and form of the under side. These instructions will appear trifling to experts in the Science, but all beginners will be glad of any attempt to direct their proceedings aright.

The water walkers, water scorpions and water boatmen require different treatment. A water-net must be provided which is constructed on this plan: an iron hoop, ten inches in diameter, is screwed to the end of a strong but light bamboo-cane, and on this hoop is fastened a bag-net, which of course is ten inches across at the mouth, and tapers gradually to the bottom a depth of eighteen or twenty inches: this bag-net is made of cheese-cloth, a fabric that has two excellent properties; *first*, it is so strong that tearing is out of the question; and, *secondly*, it allows the water to pass through freely. This implement may be used wherever there is water; in rivers, canals, ponds or ditches; especially at the sides where there are weeds growing in the water; for these weeds always abound with insect life, and you will invariably be more puzzled with the multitude of captures than disappointed by want of success. A great number of beetles inhabit water; the carnivorous and the herbivorous beetles have both a large aquatic section, and some of these you will infallibly find in every haul. But I am now only talking of Hemiptera. I always provide myself, when on these fishing excursions, with two or more wide-mouthed vials half-full of whiskey; and, as soon as the water has strained off, I go down on hands and knees, and pick out the insects, popping them, one by one, into the vial. All the water Hemiptera are carnivorous, and desperately savage when handled; the water boatmen especially will instantly make a dig at your fingers with their sharp beaks; often have they made my blood flow very freely. But you soon get into the way of avoiding

their bites by a little skill in the handling; and the whiskey soon prevails over their propensity to fight with and damage their fellow-captives. If put into the bottle alive, and without spirits, they are quite sure to injure each other.

These water Hemiptera may be kept in the spirits almost as long as you like, and when perfectly convenient you may take them out at any time, and after soaking them thoroughly in hot water, dry them on blotting-paper, and either pin them or card them just as you please. The cards to use for this purpose are called "printers' large extra;" the best cost about 8*d.* a pack, and one pack will probably last through the season. Different opinions prevail as to the size and shape of the cards; some entomologists prefer the cards all of one size, others all of one shape. I think questions of this kind are scarcely worth considering, but as Nature has introduced a great variety in the shape and size of her beautiful creations, so there can be nothing very improper in allotting to each individual an allowance of card somewhat in proportion to his bulk. Gum is an article that requires more care, and the best is made by mixing equal quantities of the most pure and colourless gum trajacanth and gum arabic, adding a small portion of corrosive sublimate.

But there is no objection to take home the captured Hemiptera in a perfectly wakeful state. If you intend doing this, provide yourself with a wide-mouthed vial and put in it a few strips of blotting-paper: drop the insects when caught into the vial, corking it after each is imprisoned. When arrived at home fill a small white basin with boiling water, uncork the vial over it and let the prisoners fall in; if any remain in the vial, give the bottle a sharp tap and they will fall into the water: death follows instantaneously and without a struggle. Dip them out with a tea-spoon and lay them on blotting-paper. While the paper is absorbing the water, prepare the cards, gum-water, &c., for setting them out; you will find the limbs pliable and ready to take any position in which you wish to place them. Mr. Douglas tells me he prefers this hot-water mode of killing Hemiptera, but I have sometimes thought that hot water destroys the brighter colours.

EDWARD NEWMAN.

Monograph of Tenthredinidæ much wanted.—I wish some entomologist would take upon him to monograph our Tenthredinidæ, as Mr. Smith has done the bees and Fossores; it is a work much wanted. At present this family appears in the utmost confusion, no one venturing to give an opinion for fear he might not be correct. Perhaps Mr. Smith would be good enough to take up this next-of-kin to his favourites the Aculeata, as I am sure his pen and pencil would do us an infinite service by so doing.—*E. Parfitt; Museum, Taunton, February* 4, 1860.

Description of a new Species of Hemerobius.—The following is a description of a species I took here last autumn:—

Hemerobius Hagenii, *Mihi.*

H. Testaceo-flavescens. Antennis fusco-annulatis. Oculis nigris; femoribus et tibiis pallidis; tarsisque rufescentibus. Alis hyalinis, punctis fuscis sparsis; stigmatibus aurantiacus.

Long. corp. 2 lin. Exp. alar. 6½ lin.

Pale testaceous. Eyes black. Antennæ pale yellowish, rather short and thick, annulated to the tip with dark testaceous rings. Wings pale testaceous-yellow; the nervures slightly darker and dotted with brown; a few larger blotches of the same colour towards the apex of the wing; stigmata forming a bright orange blotch, very conspicuous. Posterior wings paler than the anterior, and without the brown dots, but having a bright orange blotch on the anterior margin, corresponding with the stigmata of the anterior wings. All the wings beautifully iridescent. Legs pale yellow; the ungues dark ferruginous.—*Id.*

Ants' Nests and their Inhabitants.—When I was in the habit of visiting Rannoch and similar places in the far North,—where these things grow wonderfully large,—their investigation for beetles was not then so fashionable as it is now, or I might possibly have swelled the present list; in short I did not know that there was such a *lapis mir(e)*abilis underneath them, and the consequence was, my search only extended to the procuring the larvæ of Cetonia ænea. The Germans, I believe, were the first to risk themselves in a colony of this kind, and to proclaim to the entomological world the wonders they had met with. Their antecedents soon procured hands as bold amongst us, and, thanks to their exertions, our lists soon showed the good they had done. I confess it is rather a startling thing to come upon an ant's nest, about six feet in diameter by say eighteen inches in height, literally covered with a heaving blacklead-coloured mass, making a continual little crackling noise; after having examined them attentively for a little while, you next naturally begin to look at the ground on which you are standing, and also to look all around you, and you see that although these ants are not so crowded as on the nest, yet they are there by hundreds, and that during the short time you have stood watching them many have found an opportunity of examining the watch-chain at your waistcoat-pocket; and others—with a more hidden meaning—have crawled up the legs of your trowsers: the reasons for their doing so you will find by-and-bye. But to the ants. There is no hope of obtaining the beetles, except by plunging through that living mass and lifting away a portion of the nest, and so you must first spread a sheet of

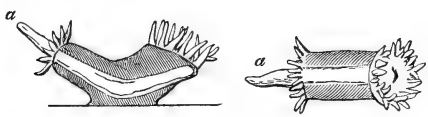
good strong brown paper on the ground; it is preferable to cloth, because the ants are not so easily detached from the latter. Next, lift off the ants with both your hands from that part of the nest you are going to carry away to your paper; and now, as though the place had been set fire to, you see thousands of little streams poured forth to extinguish it. This is the formic acid they are discharging in self-defence, and with which they seem to be liberally supplied. The position they assume to enable them to do it is a very droll one. They stand upon the back of the abdomen supported with their third pair of legs: this brings the anus, from which it is discharged, so that the stream ascends in nearly a perpendicular direction. Should it by chance get into the eyes it causes extreme pain, and it makes a sensible hot feeling wherever it touches the face, as though blistering it: it tastes like very strong vinegar and smells very like blacking. Having lifted as much as you can conveniently do with both hands (it is bad policy to take too much at once), drop it on your paper and let it lie for a few minutes that the ants may wander out of it, and in the mean-time you can be cutting a small branch from some neighbouring fir-tree, to serve as a brush to brush away the ants which have and are wandering over the parts of your paper uncovered by the piece of nest. After you have cleared the bulk of them off, remove your paper to a distance from the nest, and then proceed to investigate the contents, which you must "persuade" into a heap at one end. Then with a piece of stick or a knife-blade draw it down on to the body of the paper, a little at a time, and watch carefully. That little pitch-coloured shiny thing, about one-eighth of an inch long, is Saprinus piceus—hence its specific name; you will see it move presently. That larger black thing, not quite so shiny, is Dendrophilus pygmæus, and that dirty cinnamon-coloured piece of rotten twig you fancied had life in it, from its falling over just now, is no other than one of the Monotomas, of which there are two species to be met with, namely, M. angusticollis and M. conicicollis. Then the Staphylinidæ have many members which luxuriate in this sort of life, Quedius brevis being the largest representative. Next in length is a Xantholinus (ochraceus), a fellow you find folded up in the most uncomfortable position you could conceive it possible for an insect to take. Fancy your finger with another joint to it and bent up towards the palm of your hand — as you can do without closing the hand — and the extreme joint folded underneath the one next to it, and this will give you some idea of it. Well, this is its position, and so it lies there. I am, however, not certain that it is peculiarly an ant's-nest species, although it seems common there. Then there is Dinarda Märckelii, easily known from its flat, broad appearance across the shoulders, and having reddish elytra. It is very active, and takes precedence of all the others in this respect. Next, a long narrow slender Staphylinus, called Leptacinus Formicetorum, and Homalota flavipes, Thiasophila angulata and Oxypoda formicetícola, may be observed trying to conceal themselves in every little cluster of the *débris*. The ants never molest them, and they seem to live on the very best terms. No one, I believe, has ever shown how these creatures obtain their living in the nests; probably the greater part of them prey upon the larvæ of Acari and other small insects infesting the nests, and which may be hatched there for some wise purpose, or brought by the ants themselves on the small pieces of fir-leaves and bits of sticks. They are for ever buzzing about. The whole of the before-named species of Coleoptera are to be found in the nest of a single species of ant (Formica rufa) and many others are also known to be tenants of the same myrmecophilous pile. I have, however, confined myself to those

species which within the last few days have fallen to my lot, and at another time I may probably return to the subject with a fresh batch of claimants for notice.—*John Scott;* 13, *Torrington Villas, Lee, S. E., April* 16, 1860.

Actinia Mesembryanthemum with Three Mouths.—I have now in my possession an Actinia Mesembryanthemum with three distinct mouths; it is only within the last fortnight that I detected the third mouth, although I have had the specimen for some months, during which it seemed to be merely a double-disked individual. Having often examined it at different periods, without noticing any sign of a third mouth, I can hardly resist the conviction that it has been developed within a short time of its detection. Double-disked examples of this species do not appear to be very uncommon. One specimen I observed last year while expanded in its native pool, but usually they have turned up among specimens taken at random: they have only occurred to me of small size and of the greenish varieties. The triple-disked individual is less than a small pea and of a pale olive-green colour, the margin of each mouth being of a deeper blue-green. One double-disked specimen apparently developed itself in one of my pans of sea-water. Having cut out the body of a limpet for microscopic purposes, I dropped the empty shell into the pan for the hermit-crabs, &c., to regale themselves on whatever might remain attached to it. After several weeks a minute specimen of Actinia Mesembryanthemum was noticed attached to the inner side of the shell, where it could not have been during the life of the mollusk, and on close examination it was seen to be double-disked. It is remarkable that none of this species of Actinia were in the pan, nor had there been any for two or three months previously.—*George Guyon; Ventnor, Isle of Wight, April* 4, 1860.

PS.—It strikes me that in my communication a few days ago, regarding double-disked Actiniæ, I termed one of my specimens a triple-disked individual; if so I made use of a phrase not exactly correct, as, although it possesses three mouths, two of them are placed on the same disk without any intervening row of tentacles; at the same time there is a tendency to such a separation, as a single rather large tentacle stands well out from the rest on one side, marking where the division should be.

Double-disked Actinia.



Side view. View from above.

a. a. Strip of Meat.

PS. 2.—Since my last communication I presented a long strip of meat to one of the mouths of a double-disked Actinia; it was of course drawn in, and in a few hours the Anemone had extended itself to take in as much as possible, a portion still

projecting from the mouth. The opposite end of the meat was just inside the rim of the other disk, further than which it could not go. The next morning the food had been digested, and was being at the same time rejected by both the mouths, showing, if proof were needed, that they led to the same stomach.—*Id.*

Proceedings of Societies.

Entomological Society.

April 2, 1860.—J. W Douglas, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'The Zoologist' for April; presented by the Editor. 'The Proceedings of the Zoological Society of London,' 1859, Part 3; by the Society. 'Journal of the Proceedings of the Linnean Society,' Supplement to Vol. iv. Botany; by the Society. 'Exotic Butterflies,' Part 34; by W. W. Saunders, Esq. 'The Journal of the Society of Arts' for March; by the Editor. 'The Literary Gazette' for March; by the Editor.

Elections.

Dr. E. Candeze, of Liege, Belgium, was elected a Member; and George Seaton, Esq., of Trinity Square, Brixton, and J. C. Young, Esq., of Redwood House, Bromley, were elected Subscribers to the Society.

Exhibitions.

The President exhibited some specimens of a species of Trogoderma, which had bred in great numbers in rice imported from Akyab, about two years since, and now at Hibernia Wharf, London Bridge; he also exhibited a quantity of the damaged rice in which, he was informed, the larva had increased to a great extent within the last nine months.

Mr. Stevens exhibited some splendid Lepidoptera sent from Batchian by Mr. Wallace, amongst which were beautiful examples of both sexes of Ornithoptera Crœsus, Papilio Orumnus, P. Deiphobus, P. Codrus, and a fine new species allied to P. Peranthus; also a small Hestia, very distinct from any described species.

Mr. Lewis exhibited a damaged example of Telephorus atra, *Linn.*, a species not hitherto recorded as a native of Britain; the specimen exhibited had been taken in Scotland by Mr. John Scott, and determined by Mr. F. Smith and himself, by comparison with continental examples in the British Museum collection.

Mr. Janson exhibited some Coleoptera taken at Rannoch by Mr. C. Turner.

Mr. Westwood observed, with reference to the large species of Bruchus, exhibited at the last December meeting by Dr. Wallace, as infesting the interior of the nest of the Coquilla (Attalea funifera of Brazil), that there appeared from an investigation which he had made with a view to the determination of the species in question, to be considerable confusion in the nomenclature of the species allied to Bruchus Bactris of Linnæus. That name had been given to a species which

infests an American palm of the genus Bactris, and which had been first figured by Jacquin in his 'History of Select American Plants,' pl. 170. According to Schönherr, this species of the allied Bruchus Nucleorum of Fabricius are at once distinguished by having the intermediate joints of the antennæ marked on the upper side with a deep oblong impression. It may, however, probably be questioned whether in the absence of specimens reared from the same species of palm, there is sufficient ground for the distinct identification of the Linnean species. In the 'Proceedings of the Entomological Society,' September 4th, 1854, some seeds of the wax palm of the Brazils, Copernicia cerifera, were exhibited, together with the beetles reared from them. These were purchased by Mr. Westwood at the sale of the Society's exotic collection, and are now in the Hopeian Museum at Oxford. The beetles agreed with Gyllenhall's diagnosis of Bruchus Bactris in Schönherr (i. p. 93).

Latreille's Bruchus curvipes (described and figured by Humboldt, Obs. de Zoologie, p. 158) was obtained from the fruit of a palm near Serullo, in New Spain. It has longer black antennæ, with entire joints. Germar's Bruchus ruficornis infests cocoa nuts brought to Europe, — the fruit, apparently of a species of Bactris (probably Bruchus minor); it differs from Latreille's species in having red fore legs and antennæ, but is given as synonymous with it by Schönherr, without, as appears, sufficient cause.

Sir William Hooker had forwarded to Mr. Westwood a larva of one of these large species of Bruchi found in the interior of a seed of a palm (a species of Astrocaryum from Bahia) which had been received at the Royal Gardens, Kew: the larva differed in no respect from that of the Coquilla nut. Mr. Westwood had also obtained the nut of another kind of palm, in the interior of which was found a perfect beetle, which seems in no respect to differ from Bruchus ruficornis of Germar. Mr. Kirby also possessed a specimen of a large and closely-allied Bruchus, evidently obtained, from its not fully-developed state, from the interior of some nut, also purchased by Mr. Westwood, but having much larger and more strongly-serrated posterior femora. A specimen of the Coquilla-nut beetle itself is preserved in spirits in the Christ Church Museum, Oxford, in company with the nut and its larva. It also seems to agree with Bruchus ruficornis, so as to preclude the necessity of giving it a distinct specific name, until a more detailed examination of the allied species can be made. The species allied to Bruchus ruficornis are distinguished from Bruchus Bactris, not only in the smooth intermediate joints of the antennæ, but also in having the sutural stria of the elytra simple at its base; in the latter species it is accompanied at the base by two very short rows of punctures like an acute V.—*E. S.*

Notices of New Books.

Day after day I regret the way in which these notices have fallen into arrear; but how unavailing is regret! Let me, however, call attention to the extracts, which number after number of the 'Zoologist' contains: these are the cream of the zoological literature of our period; and exhibit our progress in its most favorable

light. Henceforward, however, I propose to notice in each successive number, every new publication that reaches my hands, and to combine this with an attempt to get up the arrears.

'*A Sketch of the Natural History of Brighton and its Vicinity.*' By Mrs MERRIFIELD. Brighton: W. Pearce, 5, Bartholemews, 1860. Post 8vo., 227 pp.

Although most desirous for the success of this unassuming volume, and desirous also of giving full credit to the amiable authoress and her assistants, I cannot truthfully conceal the fact that, like all local "Natural Histories," it reveals the amount of knowledge possessed by the compilers, rather than exhibits the natural products of the locality described. Thus we find, in insects, there are nine and a half closely-printed pages of the names of Lepidoptera; while of Diptera there are two pages only, and of Orthoptera and Hemiptera there is no name at all. Wherefore this disparity? It is because the Lepidoptera have been well studied, the Diptera little studied, and the Orthoptera and Hemiptera not studied at all. Because Mr. Henry Cooke has so long and ably worked at the Lepidoptera, there is a very full list of species, and because, as the authoress fairly states, "Of the Orthoptera and Hemiptera I have not been able to procure any local lists." No one works at Orthoptera and Hemiptera. Every other section of the volume in the same manner indicates with precision the amount of labour and knowledge brought to bear on that particular section. The botanical lists are contributed by Mr. Mitten, and are really excellent; and Chapter VIII., on the Botany of the South Downs, will be found most useful to the visitor in search of our native plants.

'*The Natural History of the Tineina.*' Volume IV., containing Coleophora, Part 1. By H. T. STAINTON; assisted by Prof. ZELLER, J. W. DOUGLAS and Prof. FREY. London: Van Voorst, Paternoster Row. Demy 8vo., 282 pages letterpress. Eight coloured plates.

A most valuable volume, rivalling, if not surpassing, in beauty of illustration all its predecessors. The larvæ cannot fail to excite, in the mind of the thoughtful entomologist, reflections on the natural affinities of the Micro-Lepidoptera: we have here, reproduced on a

diminished scale, the exact figures of these xylophagous larvæ which I first associated in 1832, and which constitute the most truly natural family in the entire class of Lepidoptera. Cossus, Zeuzera, Hepialus and Sesia are miniatured in Coleophora with the most marvellous precision. The price of the volume is 12*s.* 6*d.*

'*The Naturalist in Bermuda; a Sketch of the Geology, Zoology and Botany of that remarkable Group of Islands.*' By John Mathew Jones, Esq., of the Middle Temple. London: Reeves and Turner, 238, Strand. 1859. Post 8vo., 192 pages letterpress, with a Map and a few Woodcuts.

An interesting and unpretending book, exhibiting a true love of Nature, and a total disregard of self. Little indeed was known of the Natural History of the Bermudas, and even now we wish to know more. The situation of the Bermudas, so well adapted as a resting-place for birds on their migratory tours, offers abundant opportunity for observation. In the list of birds observed by our author it is pleasing to meet with many whose names are so familiar at home. Mr. Jones is again about to return to England from these interesting islands, where, amidst other valuable knowledge acquired, it appears he has already done much towards unravelling the mystery of the sea serpent. I look forward with great interest to a second series, or at least a second edition, of the 'Naturalist in Bermuda.'

'*Young England: the Butterfly Number. A Natural History of all the British Butterflies.*' By Edward Newman, F.L.S., Z.S. London: W. Kent and Co., 51 and 52, Paternoster Row. 1860. Price 6*d.*

I have no pecuniary interest in this literary venture; but as I heartily wish it success, I shall exhibit no false modesty about recommending it, although my portrait is so conspicuous on the title-page: I could indeed have wished this otherwise, but was overruled by the proprietor.

I have always held that a naturalist, that is a man who really believes in Natural History, must have two noble objects of ambition: *first*, making Natural History intelligible to every capacity; and,

secondly, making it accessible to every pocket. It is in this spirit that this butterfly number has been conceived and carried out. The portraits of all our British butterflies have been admirably drawn by Mr. Willis, and equally well engraved by Mr. Kirchner. The descriptions are all written by myself, from the butterflies themselves, and there are no italics, abbreviations, or signs of any kind: in each description are a few words, used in a sense somewhat different from that assigned to them in our dictionaries: such words are explained and illustrated by a diagram; and every description has been kindly revised by Mr. Bond. I fear that a few readers of the 'Zoologist,' sticklers for the technical, will frown awfully on this first attempt to supply Natural History for the million; but to a large majority I confidently appeal to aid my efforts by introducing the Butterfly Number into every school in their neighbourhood, and into every family where there are boys and girls in want of occupation.

Botanist's Corner.

Woodsia alpina on the Breadalbane Mountains.—Last summer, when rambling among the Breadalbane mountains, in company with my father and Thomas Westcombe, I met with Woodsia alpina in abundance. We were fortunate enough to find a locality which, to all appearance, had never been examined by botanists before, and where the plant was growing with a luxuriance and profusion that realised one's ideas of what "ought to be somewhere." Imagine us revelling in the sight of tufts of this rarity bearing sixty-five, eighty, and even a hundred fronds each, some of these four inches long. I think I remember one spot where I could see seven tufts without moving a step. They are in many instances difficult of access, and some cannot be reached without extreme danger. One noble tuft of fifty strong fronds (apparently) can be easily seen, but even a daring and skilful cragsman would have to satisfy himself with this. We subsequently found fourteen plants of W. Ilvensis among the Dumfriesshire mountains, some of them fine and well developed. The Dumfriesshire plant is the true W. Ilvensis, and very different from the true W. alpina of the Breadalbane district. In cultivation, and even in a wild state, forms of W. Ilvensis may be found approximating W. alpina in appearance; but no one who has seen the dense erect tufts of the latter in a wild state can, I think, doubt the specific distinctness of the two. I believe Prof. Balfour's Woodsia hyperborea of the Clova mountains to be W. Ilvensis. I have seen W. Ilvensis frequently in the Clova district, but never a single plant of W. alpina; and a plant procured from thence, and marked W. hyperborea, in the Royal Botanic Gardens at Edinburgh, was W. Ilvensis.—*James Backhouse, jun.; York, January* 4, 1860.

[I think there is little doubt that the Woodsia hyperborea of Hooker, Balfour and other British authors is identical with W. Ilvensis, and I think Babington right in making but one species out of the specimens known to him; but the true Woodsia

alpina, apparently unknown to all three writers, first figured by myself, 'British Ferns,' p. 79, and now found so abundantly by Mr. Backhouse and his friends, has strong claims to be regarded as a distinct species.—*Edward Newman.*]

Presence of a powerful Colouring Matter in Mercurialis perennis.—The property of the dog's mercury turning of a bluish or blackish green colour in drying, recorded by Messrs. Hooker and Arnott at p. 367 of their 'British Flora,' has doubtless come under the observation and perplexed many collectors of botanical specimens, but I cannot ascertain that it has ever been attributed to the presence of a powerful, and in many respects peculiar, colouring matter. Many plants lose their colour in drying, from the decomposition of the green pigment in its reaction with other products, as tannin, &c.; but the discoloration of the Mercurialis results from the production in the process of drying of an extremely soluble bright blue colour, not the slightest evidence of which occurs in the living plant, though of course, like many others, it pre-exists in the plant in a colourless state. Gradual drying appears most favourable to its development, as if the life of the plant is too suddenly destroyed by desiccation; at a high temperature little or none is produced. If the plant be allowed to gradually wither and lose its moisture in the open air, the presence of the colouring matter is made evident by the green parts turning of an inky colour, and the blanched part of the stem from underground of a rich metallic blue. The colour is most abundant in the early spring, when the plant is about six inches high, and gradually disappears as it attains its maturity in the autumn. The extreme solubility of the colour is easily manifested by placing a little bit of the dried plant in cold water, which in the course of a few minutes will be turned of a beautiful indigo-blue. When I first noticed it I rejoiced in the hope that I had discovered a new source of indigo, but soon found its properties in no way corresponded with that colour. Blue indigo is intensified in colour by sulphuric acid, and forms a straw-coloured compound with nitric acid. The blue pigment of the Mercurialis, as far as I have been able to ascertain, is turned red by all acids; indeed one of its principal characteristics is the extremely fugitive character of the tint as at first developed, and its tendency to change into a reddish purple. It differs from many vegetable colours, for example, litmus or red cabbage, in the red, produced from its blue form by acids, not being reconvertible into blue by an excess of alkali. A slight increase of temperature immediately converts the blue into a reddish purple tint, which appears to be the only permanent form of the colour. The blue colour also disappears on the solution standing for a few days, probably the result of incipient fermentation. In the dry state, as it exists in the plant, it appears to be more permanent, but I have not yet been able to dry from the solution the blue form of the colour. As a liquid, whether red or blue, it invariably evaporates to a rich reddish plum-coloured paste. I have been rather minute in the description of its characteristics, in the hope that some one may investigate the subject in a more practical form, and endeavour to utilize this product of one of our most abundant plants. I have little expectation that the blue form of the pigment can be made available by the dyer, but should think the permanent form, which is a fine rich colour, would make an excellent dye. According to Dr. Lindley many of the natural order to which the Mercurialis belongs have been made subject to the dyer's art.—*George Maw; Broseley, March*, 1860.

Proceedings of Natural-History Collectors in Foreign Countries.

Mr. H. Mouhot.*—Mount Sabab, Koumban, Chantaburi, Siam, June 6th, 1859.—Siam is not so good a country for the naturalist as is generally imagined. This country offers nothing very brilliant in colour, nor extraordinary in the form of its productions. There are also difficulties to contend with seldom found in other countries; the indolence of its inhabitants, their state of slavery, besides their religion, which forbids them to kill any animal, give you to understand at once that you must not expect much assistance from them. I am also obliged to go on groping my way, as it were, and making new attempts, for all the Europeans established at Bankok are of opinion that this country is inexplorable, on account of its climate and dangerous inundations, and effectively I find that the localities which would prove the most productive are just those which are uninhabitable, even for the natives, during the greater part of the year.

Now, however, I feel assured that you will be infinitely better pleased with the collection I am sending you, for it consists, for the greater part at least, of very good species,—Lucani, Longicornes, Anthribi, good Carabi, &c.,—captured just where you now recommend me to search, principally at the foot of the mountains, on their sides and under the bark of dead trees, so that during the last two months the hatchet has been more at work than the net. I send you only about thirty butterflies, as they are rare and mostly very common. Birds are excessively rare here; they retire to the plains or the woods during the dry season, and are only found on the mountains during the inundations. During the time I have been on Mount Sabab I have only seen one hawk and not a single partridge, quail or pheasant, and yet I pass the greater part of my time out of doors, and had we not made our provision of dried fish and rice we should be obliged to eat the insects instead of sending them to you, or died of hunger.

Though I have only been three months in this province I am about to leave it, and am going on to Cambodia, which I believe to be much richer, being more woody, less cultivated and more thinly inhabited. By waiting longer I should lose a whole year, as the rainy season is commencing, and soon all communication with that country will be at an end until the dry season again commences.

The topography of this country being so little known I cannot yet tell you in what part I shall take up my abode; it will probably be

* Communicated by Mr. S. Stevens.

beyond Bakambong, near the first mountainous district I shall find in Cambodia. I propose our travelling on elephants 100 or 150 miles; and in the month of January I expect to bring my collection to Bankok, returning by the north-east; until then you will probably hear nothing more of me, and I shall be deprived of the pleasure of hearing from Europe. Be patient then, and be assured that I shall not mind what privation or trouble I undergo, so that I discover what is rare or new.

After having received the collection I now send you, it having been made in a mountainous district, you will be able to judge what the country is really worth. Be so kind then as to give me your advice as to which will be the best locality for next year. My intention at present is to go as far as Chieng Mai, near the frontiers of China and the Birman empire, quite at the north of the kingdom of Siam; you will then see whether the north-east or the north-west is the best. The mountains on the northern extremity, and almost dividing Cochin China from Siam, undoubtedly must be good, and should offer the productions of both countries; travelling in that direction would not be excessively dear, or would you rather advise me to go as far as the Kalmouks or the Tickhohos or Tickdohos before returning south. The rainy season has now commenced, after five months of dry weather such as has not been seen for thirty years; it brings with it insects, but plenty of mosquitoes and leeches as well. It will be many years before I regain all the blood which those tormenting suckers have drawn from me. What I most fear is to be obliged to remain several months without being able to do much, as the rain begins to fall in torrents, and keeps me in doors four or five days together. Again I have to combat with the ants and cancrelats, spiders and other destructive insects, which the rain obliges to seek for refuge in houses, and which from time to time, notwithstanding the greatest precautions, destroy part of my collections. I find that ashes put round the feet of the table prevent the former from reaching them quite as well as, and even better than, wood oil, which dries very quickly, or water, which evaporates very soon. I have no other or better remedy against the latter than to rub every evening the exterior and edges of my boxes with wood oil, mixed with the oil of the cocoa to make it more liquid and sticky; I also dissolve a little naphtaline and camphor, the smell of which keeps off all winged insects; but fish oil, of which I have none at present, is incomparably better than all. The damp is also another terrible enemy, against which fire is the only remedy, so that I am obliged almost every rainy day to place my boxes in a warm

place, where there has been a good fire, of which nothing remains but hot coals and ashes, and to take care to turn them frequently. To kill insects I employ a means which I consider preferable to all others: I have a tin biscuit-box of very small dimensions, closing hermetically and with ease; in case of need I slip into it the small flat pieces of cork upon which I have pinned my insects; I then close it and expose it for a few minutes to the sun, or near the fire if the day is cloudy. In this manner the most lively insects, such as the Longicornes and the Lucani, soon die. They also dry very quickly when exposed to the sun in a tin box left open. As to the skins of birds I put them in a box on cotton, taking care above all that the edges are well covered with it; that alone is sufficient to prevent the ants from penetrating. It very often happens that a bird is brought to you with its delicate plumage covered with blood, and after having washed it you have no plaster to dry it; fine sand will, however, answer every purpose; you have only to rub the feathers after having washed the bird with rather a hard brush until it is quite clean and dry; of course the drier and warmer the sand is the better it will answer your purpose. Should you think that these few remarks might be useful to collectors, and especially to travellers, I shall be obliged to you if you will make them known, for in distant countries, where one is frequently deprived of all resources, and where one has frequently no other shelter than a miserable hut, simple expedients are in reality the best, as a very trifle may save from destruction rich and valuable collections.

All my researches for insects upon the higher parts of the mountain, where there are neither footpaths nor fallen trees, have been unfruitful, and I have found a considerable quantity at the base, and especially in damp places covered with dead wood, the dried bark of which parts very easily from the trunk. The province of Chantaburi, where I am at present, is one of the most beautiful, the most healthy and at the same time the most thickly populated in the kingdom of Siam. The population of its chief town is only 2500 or 3000, composed of Annamite fishers, Chinese merchants and Siamese cultivators, but the environs contain more than double that population. All the base of Mount Sabab and other neighbouring mountains are inhabited by Chinese, who plant pepper and sugar canes, the Siamese being further off towards the plains, where they have their rice fields. Unhappily, here, as in all other parts of this country, slavery and the heavy taxes which oppress the cultivators prevent all progress as well as the increase of the population. Coffee, which grows admirably here, and is of a superior quality, is only cultivated by the Governor.

How much it is to be wished that this country should one day pass into the hands of a liberal and enlightened nation, such as England, for then it would become the abundant granary of the East. Egypt, formerly so celebrated for the fertility of its soil, the variety of its productions and the overflowing of the Nile, is far from being equal to the kingdom of Siam. The tree which produces the gum gutte is found on Mount Sabab, though not so frequently as in Cambodia. It blossoms during the cold season, in the months of November and December, so that at present I can only send you a few specimens of the wood. The trees which produce the eagle wood are rather common in this and the neighbouring provinces : the Annamites of Chantaburi who pay their tribute, or rather their personal tax, with it, make a secret of the indications by which it is known. The information which I have, however, been able to procure has put me in the way, and having caused several of these trees to be cut down upon the mountain I have made the following remarks. The tree which contains the eagle wood ought to give a hollow sound when struck with the back of the hatchet, because it is only in the cavities it is found. The older the tree is the more it generally contains. In the trunk there is also to be found a few empty knots, from which escapes the smell of the eagle wood, more or less strong, but as to the quality and quantity it depends entirely on the chance one has to fall in with a good tree. I now send you some specimens of this wood, of the stem of the eagle wood, also a quantity of other gums, Indian rubber, gutta percha, &c., found here, and are also very common in the large and mountainous island of of Ko-chang, situated near Thung Tai. Unfortunately on my return from exploring the islands and being at Pak-nam-ven, my servants having lighted a fire to keep off the mosquitoes I had one morning all the skin of my bark consumed, and also my finest specimens of gum, which I had collected in the bamboos. However, it will be difficult even to obtain anything from that island, which is almost a desert, and is the terror of the natives on the coast, on account of the ferocity of the tigers which infest it.

Among the Stieng Savages, Brelum, October 15th, 1859, North Lat. 11° 46′ 30″. Long 103° 3′, East of Paris. — I profit by a favourable opportunity which has just presented itself to write you a few hasty lines, and to give you signs of life: for the last two months I have been among the Stieng savages in

the middle of their immense forests, latitude precisely as indicated above, where I have passed the most favourable season for collecting insects and land shells. Notwithstanding the King of Cambodia having given me a letter, in which he gave orders to all chiefs of (Skok Khmer) the Cambodia villages to furnish me with the means of transport for my journey, I have had much trouble to arrive here, as frequently neither chariots nor buffaloes were to be found in the hamlets through which I passed; besides, the Cambodian being the worst of all the species of animals found on the globe, like the ass, the only means of bringing him out of his state of lethargy, bordering on stupidity, is by beating him. This will give you a slight idea of the manner in which I have accomplished my journey, which lasted a whole month, three times as long as I could have made it on foot.

On the 21st of July, after having reached Pinhalu, a village nine miles from the capital, I went down the large branch of the Mekong, as far as Polompa, a commercial city peopled with Chinese, at the conflux of two rivers. I then went up the great Cambodia River; the waters of it were still low, as all through the country the rainy season is more than two months later than usual. The Mekong is covered with islands, many of them eight or nine miles in length and more than a mile in breadth, such is the large and beautiful island of Ko-huten, which I reached in five days; judge then of the width of this river, which I consider to be about three miles. Pelicans are found upon it often in troops of more than fifty together, and especially the sandy parts are covered with an immense number of storks, sea-swallows and other aquatic birds. The general aspect of this mighty river is, however, more gloomy than gay; its water running with the rapidity of a torrent undoubtedly is most imposing, but that is all. Few boats are seen upon its waters, and its shores are nearly desert, the forests being more than a mile distant from them, and long grass or heaps of earth, which undermined by water fall down on the least noise; this is for the most part what is seen or heard.

The Menam is much more animated in its general aspect. The rapids and cataracts commence at about thirty or forty leagues north of Ko-huten, on the confines of Lao, where it is necessary to quit large barges and take canoes, which you are frequently obliged to transport on men's shoulders, as well as the baggage, before getting over those passages. The current of the Mekong is so strong that at certain seasons you can only make about a mile a day, and at times

the rowers go in the evening to look for the fire where they in the morning had cooked their rice. I sailed up it in a small bark with three rowers, and the current was so strong at the turning of the river that it was almost impossible to proceed; it was necessary to make a thousand efforts and even to hold on by the rushes, so as not to be carried away by the current. Eight days after leaving Pinhalu I arrived at Pempticlan, a large Cambodian village, from where it was necessary to travel by land. There remained one hundred and sixty miles to accomplish in chariots towards the east. I met with a good reception from the mandarins placed by Government over all this part of the country, and on the evening of the following day I was able to set out. The first day the chariots upset, and I found it almost impossible to proceed; we met with fearful bogs, quagmires and marshy ground, but still more terrible, the chariots sunk to the axletrees and the buffaloes to their bellies. The following day, happily, the road became better, but during three weeks we saw nothing but a few poor rice fields near the villages, and we had to continue our way through a marshy plain covered with thick and dark forests, which remind one of the enchanted forests in the description of Tasso, and it seemed almost that from every trunk which was struck, there was about to appear some enchanted being; and it is easy to understand that the imagination of this Pagan people fancied those dens of monstrous and fearful animals to be the dwellings of malevolent spirits: twenty times in an hour the troop of men who—beside the conductors of the chariots—accompanied me, were obliged to raise the large branches and cut down the trunks which obstructed our passage, and at times to make a new passage altogether. Beyond Penhalu the Cambodians were much surprised to see us go amongst the Stiengs, and at the worst time of the year, for there the rainy season had commenced; even those who live nearest them dare not venture to approach them, so that had I not brought from Siam the two domestics which I had in my service, I could not have been able for any money to have found a single individual to follow me; even they felt the greatest repugnance to advance. As at Siam, Cambodia has a terrible reputation of insalubrity, and unhappily for my domestics and for myself, all were attacked with fever in the middle of the forests; and since then I have had instead of their services, two patients to take care of. In passing through a village, peopled two-thirds by a barbarian race of Annamites, I risked being taken by them and finishing my explorations in a dungeon, where I should have found no other insects but

lice, so large and fat that they consider them most delightful. Last year the chariots belonging to the French missionaries were completely robbed, and the men who conducted them seized, and with ropes round their necks conducted to Cochin China. I approached them, defying them to attack me, loading all my arms before them; they were enraged in their hearts, but stood in awe; and the two following days, as I expected continually to be seized upon by surprise, I advanced with a pistol in my hand and my finger even upon the trigger; however, a little audaciousness had sufficed to keep them off, as I passed through without being molested. Notwithstanding the fatigue, the heat and the privations unavoidable in such a journey, I arrived safe and sound, for my own part, among the Stiengs, on the 20th August, at a part called Brelum, where I found a station of Catholic missionaries from the Mission of Cochin China, and at some miles from its frontiers. To have proceeded further would have been impossible, as we could not have found the means of transport or provisions at this season of the year: the poor savages have consumed all their rice, and they have nothing to subsist upon but herbs, a little maize, and a little game which they procure in hunting. I accepted then the hospitality which was offered to me by a good missionary in his establishment, which happily was pretty well furnished.

In a week or two the rainy season will have finished and the nights will become cold, so that there will be no insects to be found for several months; I shall then be occupied with birds exclusively. My departure from this will depend upon circumstances; perhaps I shall carry this letter to Panhalu myself; it is also probable that I may be detained some months in this locality, on account of the bad state of the roads and the impossibility of procuring vehicles during the rice harvest. Perhaps you would wish to know what this strange people are—supposed to be living alone on the plains and mountains of Cambodia, which they appear never to have left, and differing totally in manners, language and features, from the Cambodians, Laotians and Annamites,—all I can tell you is that I am led to believe that they are the aborigines of the country, and that they have been chased into these parts by the repeated migrations of the Thibetians, from whom evidently the Siamese descend, as well as also the people I have been speaking of. They appear to have had the same origin, if we may judge from their resemblance to each other, their religion, their character, their manners, &c.

All the country from the eastern side of the mountains of Cochin China to 105° long. and 11° lat. to Lao is inhabited by savage tribes, known by a name ('the inhabitants of the heights'), which signifies they do not become attached to their country, and change their abode frequently. Most of the villagers are in continual hostilities with each other, but they do not attack in troops; they try to take each other by surprise, and the prisoners are sold to the Laotians as slaves; their only weapon is the crossbow, which they use with an extraordinary dexterity, but rarely at a greater distance than twenty feet; they only employ the poisoned arrows for hunting the large animals, such as elephants, rhinoceroses, buffaloes and wild oxen. The smallest wound is sufficient to cause death, and when the poison is fresh it is seldom that the strongest animal can make fifty steps before he falls; they then cut out the wounded part, then slightly roast the animal without skinning or cutting it up, so that it may be the better preserved; then all the village is called by the sound of a trumpet (which is heard at a great distance) to have a share: equality and fraternity in its most perfect state exists in these little communities: and our gentlemen commonists would be surprised to find all their theories put into practice, but engendering nothing but misery.

The strongest European could not use the bow and arrow which the weakest and smallest of the Stiengs string with ease, the effect of habit. Nor are they altogether unacquainted with agriculture; they sow rice, plant gourds, water-melons, bananas and other fruit trees; their rice fields are kept with the greatest care, but most of the hard work is done by the women; during the rainy season the men seldom go out, principally on account of the leeches which swarm in the woods in such a manner as to render them inaccessible; they therefore keep to their fields, where they construct small huts of bamboo, but as soon as their harvest is over and the healthy season returned, they are continually either fishing or hunting; they never go out without their bows and a large blade of a knife with a bamboo handle, a basket on their back and another on their head. They forge nearly all their instruments with a mineral they get from Annam or Cambodia. Though they understand how to make earthern vessels, they generally cook their rice, their herbs, and even their meat in bamboos. Their clothing consists only of a band of cloth about the width of the hand, which, attached as a bandage, conceals more or less their nakedness. It is also the women who weave those kind of scarfs, which are long and sometime pretty. They are very fond of ornaments, and especially the women, who

have always their feet, arms and fingers covered with rings made of thick wire, and on their necks strings of glass beads; their ears are pierced with an enormous hole, through which they pass the bone of an animal, which is often more than three inches in circumference. They wear their hair long, the same as the Annamites, and knot it up with a comb made of bamboo; besides this they wear a kind of arrow made of wire, and ornamented with the comb of a pheasant. Their features are good and sometimes regular, and many of them have beards, that is to say, thick moustaches and an imperial: quite alone and independent in the middle of their forests, they acknowledge scarcely any other authority than the chief of the village, whose dignity is generally hereditary.

For the last year or two the King of Cambodia sent at times the Mandarin who is nearest to the Stiengs as far as their first villages, to distribute marks of honour to their chiefs, hoping gradually to bring them under his dominion, and to be able one day to get from them slaves and ivory; he has already a few who pay him a small tribute every three years. His emissaries, however, scarcely dare pass the limits of their kingdoms, so much do they dread the arrows of those savages and the fevers that reign in their forests.

The natural character, however, of the Stieng, is gentle and hospitable, and he is far from possessing the proud and stupid brutality of the Cambodian, or the refined cruelty and corruption of the Annamites; he is a good child of the forest, simple, and even generous. As to his defects, they are those of all the Asiatics,—cunning, an extraordinary ability to dissimulate, and idleness; his passion is hunting, and he leaves most of the hard work to the women. In this they differ also from the Cambodians, that robberies are very rarely committed among them. They believe in a Supreme Being, but they only invoke the malevolent spirit, so that it may leave them in peace. They bury their dead near their dwelling, and cover the tomb with a roof of leaves, so that the soul of the departed may come and repose there, eat the grains of rice, drink water or wine, which they take care to place there frequently in small tubes of bamboo. On the roads formerly frequented by their departed relatives, and in their rice fields, they place similar offerings, which remind one of the custom of the Chinese,—"Come and visit us often, poor soul;" they then say, "here is rice to eat, water to drink, a little earth to repose upon, and arrows for hunting." They do not believe in the transmigration of souls, but they believe that animals have also souls, which live after the death of their bodies, and that their souls

continue to wander about in the parts which they frequented during their lives. When they kill an animal they never fail to make a small sacrifice to it, in case its soul should come and torment them; they also ask pardon for having deprived the soul of its body. When it happens to be a large and fearful animal, such as an elephant, the ceremony becomes more imposing; all the village takes part in it, and during several days instruments and songs resound, so as to appease the soul of the majestic animal.

Their superstitions are numerous; the cry of the owl during the night, the sight of a crow when about to set out on a journey, are considered bad omens, and are sufficient to make them change their plans. When they are sick it is the demon they say who torments them, and day and night, without intermission, they make a fearful uproar around the sick man, so as to deliver him from its power; and their noise does not cease until one of them falls down, as if in a swoon, crying out, "I have him! he has passed into me! he is suffocating me!" They then interrogate the newly-possessed as to the remedies which must be used so as to cure the patient, and then what the demon requires or demands to abandon his prey, which is at times an ox, a pig, and, too often, a human being; in the latter case, they without pity seize upon a poor slave, whom they sacrifice to the malevolent spirit. They imagine that all white people inhabit small corners of the earth situated in the middle of the sea, and they are so simple that they frequently ask whether there are women in our country? If you answer them, in jest, "No"; and tell them that when one wishes for offspring you have only to pull out a few hairs, plant them, and by the heat of the sun they grow into little children, they are willing to believe it, and ready to make an experiment unless you undeceive them. What they are most in want of is salt, and this is perhaps the cause of many cutaneous diseases which I remark among them, and this want of salt arises from the fear which the Cambodian merchants have to penetrate into their country.

Besides this, the forests well merit the reputation they have of being insalubrious, and the natives themselves are tormented with fevers. The two French missionaries, who, like lost sentinels, occupy this solitary post, have suffered much from various diseases. Out of fifteen Annamites who accompanied them here, two-thirds are continually travelling about. My own health, thank God, is excellent, notwithstanding hard work and long journeys, and the hatchet is at work as much as the net. We are here surrounded by tigers, rhinoceroses, buffaloes and wild oxen. However, those terrible neighbours cause

more fear than hurt; if they come out of their impenetrable dens during the night, the presence of man at sunrise makes them quickly return to their retreats, and to obtain them it is necessary to pursue them a long time, and to wait near the ponds and marshes where they go to drink.

The fallow deer differ from those of Siam, and most resemble those of Cochin China. I have found many good and rare things here, but it is not unlikely that later I may find the same in Siam. The bamboo wood, which I had neglected for a long time, furnishes me now with an abundant harvest,—magnificent longicorns, which I much wanted. From one day to another one may prepare a quantity; it is sufficient for this to cut down some of those trees near the paths, leave them to suspend obliquely and attached to the summit of a neighbouring tree; at the hottest part of the following day you are sure, on visiting them, to find those beautiful insects near the knots, or at work perforating the trunks, so as to make incisions.

What will also cause you to rejoice, my dear Mr. Stevens, is the beautiful collection of land shells, and of which I am endeavouring to make ample provision. When, and above all how, am I to return to Cambodia, and from thence to Siam? I dare not think of the difficulties which await me with this wretched people, the Cambodians, in transporting my treasures; the dreadful shakings which my boxes of insects will have is heart-breaking, and I hope you will join your ardent wishes to mine that the beautiful collection which I already have, and which I shall, I hope, enrich still more, may be received by you in a perfect state, and at least that a part may be saved, so as to enrich and be of some service to Natural History. "Poor soldier of the Science, they are thy trophies, and when lost, it is so much the more painful, having gained them by the sweat of thy brow." Should the war with Annam cease, I might visit a corner of that country and return by water to Pinhalu. I do not, however, count upon that, but in short those who live will see. In recommending myself to your kind remembrances, I bid you good-bye, and wish you the same health which I enjoy in the forests of the Stiengs: may God preserve me from their arrows.

H. Mouhot.

PS.— 20th December, 1859. — I arrived last evening at Pinhalu in perfect health, and am just setting off to the North to visit the famous ruins of Onkor, and to return to Bankok by Korat. I have scarcely time to write a few lines to you and to my family, so that you may be

at ease on my account, and to inform you at the same time of a collection which I am sending off by Kampot, Singapore. As you will see, I have passed among the Stiengs sufficient time to make a fine collection, and I have not spared myself any trouble to attain that end. At the same time I am only half satisfied in some respects; birds are so rare that I have only procured a few; in the next place, the terrible shaking which they have had has much injured them. As to my insects and my most precious shells, I have been obliged to have them carried by men as far as this, and I am sending to Kampot in the same manner; it is expensive, but at the same time the only way to preserve them from being completely destroyed.

I suspect that a packet of letters for me must have been lost, as I have not yet heard of the arrival of any of the collections sent; you may imagine how painful that is. On my arrival at Bankok I will send you some good maps of this almost unknown country, and more details than I can give you at present of the divers savage tribes by which it is inhabited. I am nearly convinced that much time is lost in working very hard here, as the country is poor and very difficult to explore, but that will not discourage me, and I hope during the course of next year I shall be able to send you some collections which will cause you pleasure when you receive them.—H. M.

On the Habits of the Aye-Aye of Madagascar.

By Humphrey Sandwith, Esq.*

Some time ago Professor Owen wrote to me, begging me to procure him, if possible, a specimen of this animal, as the British Museum possessed neither its skin nor skeleton. Although the museum of Port Louis is small and insignificant in the number of its specimens, it is in this respect richer than that of Great Britain with its immense collection of curiosities, since it possesses a stuffed aye-aye, which does honour to the stuffer, both on account of its natural attitude and the excellent manner in which it is preserved.

Now, when we examine this little creature, we naturally ask, whereabouts in the animal kingdom it ought to be placed. Those who are unacquainted with Natural History pronounce it to be a lemur, and really with great reason, although Cuvier has placed it more correctly

* Translated from the 'Proceedings of the Zoological Society.

in the order of rodents, and associated it with the squirrel and rat. There are, without doubt, excellent reasons for associating it with the lemurs, because, in the first place, it comes from the only country where the lemurs are found; and secondly, because no rodent has the rotating power in the bones of the fore-arm, neither can it, like man, move its members separately and use them as prehensile instruments, a peculiarity which we observe among the Quadrumana; and certainly no rodent possesses opposable thumbs on all the four feet: this character proves that the aye-aye has some affinity with the monkey and lemur, and that it is capable of climbing trees. From what I have just said it might be placed in the same family as the lemur, especially as it comes from Madagascar, but we shall probably change our opinion on examining the mouth. I would also wish you to observe that at first sight it resembles the lemur equally in its movements and the form of its body as in its tail and feet; however, if it is attentively examined, you will see that a great difference exists between the feet of the aye-aye and those of the lemur. In the lemur the finger which may be considered the index of that animal is provided with a claw, while the following fingers have flat nails, like those of a human being or a monkey; but you see in the aye-aye very curious claws, which cannot be compared with those of any other animal. They agree exactly with the habits of the aye-aye, just as those of the lemur are fitted for the habits of that animal; but they are very different. This is another proof that Nature has various ways of attaining the same results. The fur of this animal is also less woolly than that of the lemur, but it is in approaching the head that we perceive a great difference between these two animals. First let me call your attention to the form of the head. At first sight it appears to be that of a nocturnal animal; its large and naked ears, much resembling those of a bat, are so constructed as to enable the animal to detect the slightest noise in the silence of the night. I must confess that I was a little puzzled on this point, this animal not being carnivorous like the cat, which is obliged to listen for the footsteps of its prey; it is, on the contrary, frugivorous, but not exclusively so, otherwise its teeth would resemble those of the monkey,—at least it would have no occasion for the large incisors. Observe that its teeth are so formed as to enable it to gnaw the hardest wood. They have no enamel, except in front, so that the inner surface at the extremity of the tooth is more quickly worn than the outer, and gives them the form of a chisel. The roots of these incisor teeth are probably persistent, like those of the other rodents, so that the teeth grow at the base

exactly in proportion as they are worn away at the extremities. The lower jaw, like that of the other rodents, moves evidently by means of a longitudinal condyle, so as to prevent any horizontal movement from back to front, and *vice versâ*.

Here then is a powerful rodent possessing a very delicate sense of hearing (a combination which induces me to believe the account of the inhabitants of Madagascar, who assert that this animal listens to the noise of the worm in the interior of the tree, and that it then gnaws the wood until it has reached the worm, which it extracts with its long and slender finger), a description applicable to many other rodents. These animals, especially the mouse, the hare, the rabbit, and a still larger animal, the chinchilla of South America, besides having strong teeth designed for gnawing, are gifted with a very delicate sense of hearing. Living in constant fear of the larger Carnivora this delicate hearing is absolutely necessary to warn them of approaching danger; while the Cheiromys or aye-aye, living in trees in a country where there are no Carnivora of a magnitude to endanger its safety, has nothing to fear from the attacks of enemies, so that its acute sense of hearing must be provided rather as a means of attack than of defence.

I had arrived at this point of my observations; and, judging more from the supposed food of the aye-aye and from his general conformation than from his habits or his teeth, I had fed him with bananas and dates, thinking, of course, that as he was adapted for living on trees and had no canine teeth, far from being carnivorous he must be frugivorous and insectivorous. I had him one evening in my room, and observed all his movements. It was very curious to see him climbing on the chairs and tables, and carefully observing the wood of each piece of furniture. While he examined the partition I heard a continued slight noise, which was quickly repeated, and I was some time in discovering the cause. At last I remarked that from time to time this little animal gave rapid, slight blows, which produced a vibrating sound, with the second finger, that thin thread-like member which resembles a bent wire, and by means of which it is said he draws the worm from the trees: while he thus struck the wood he seemed to listen attentively. Once as he crossed my room, after having struck the floor he began to tear the matting with his teeth. As I was not disposed to allow him to destroy anything I was obliged to drive him away, but I felt convinced that he did really eat the worms which he found in wood, as it was related. Thus we have now among animals what the woodpecker is among birds, for although the latter is insectivorous it also lives on fruits and even on eggs.

Another very remarkable peculiarity of this little creature is his manner of drinking. Having placed a finger-glass of water before him I observed his movements; he approached the vase, extended his arm, and having plunged his wire-like finger into it he then passed it obliquely into his mouth; he repeated this movement with such rapidity that the water seemed to run from the vase into his mouth. It appears to me that this singular mode of drinking is the most convenient to him for extracting the water from the cavities of the trees, the natural reservoirs to which he resorts for quenching his thirst.

I have followed Cuvier's system, and have placed this animal among the rodents; still, although this classification is as correct as any other we may be disposed to adopt, it appears to be inexact. Food is doubtless an important characteristic, many even say that it is the most important; certainly the teeth are the most necessary organs for eating, yet, if we take them as a means of classification, it must be acknowledged that we meet with strange contrasts; in a word, is it possible to compare for an instant this animal with the rat, either in its habits, its form or its general aspect? How different is the tail from the scaly member of the beaver, and what a striking contrast between the aquatic habits of the one and the climbing propensities of the other! Is it then consistent, because these two animals gnaw wood and have file-like teeth, that they should be ranked in the same class? Far be it from me to criticize Cuvier, or to dispute anything which that giant in Natural Science has advanced; I merely wish to point out the impossibility of arriving at a perfect classification. As for myself, if I could set aside the shackles of Science and succeed in forgetting all that I have learned, I should not hesitate for a moment to call this animal a new species of lemur, and for this simple reason,—that although it resembles the rat and the beaver in one respect, namely, the form of the teeth, it resembles the lemur in all other respects; first, in its general appearance; next, in its long thin body, in its habit of climbing trees, in the form of its claws, and especially in its long bushy tail. It has many peculiarities which we do not find in the lemur, but which are met with doubtless in the other animals I have previously mentioned: its teeth, for example, resemble those of the rodent; its ears and eyes those of the bat, because, being a nocturnal animal, it is necessary that all the rays of light should be concentrated in the pupil, which is as large as that of a cat.

Having heard that the natives of Madagascar affirm that the aye-aye eats xylophagous larvæ, and that it uses its wire-like finger to extract them from the wood, I did not implicitly believe the story,

knowing what absurd tales are sometimes related of birds and beasts. The peasants of England, for instance, firmly believe that the hedgehog sucks the milk of the cows, and that the goatsucker or flying toad that of the goats, but, although we ought to accept these popular ideas *cum grano salis*, it is quite worth while to inquire whether the habits which are attributed to the aye-aye are in harmony with its conformation; besides, I did not see why it should not eat the worms in the trees, though I could not understand why it should make use of the second finger to draw them from their holes, not believing that it could either pierce or extract the worm. However, I soon had an opportunity of proving the truth of this assertion: having found some branches which had been eaten by worms I placed them in its cage, and observed its movements. I soon saw it climb on one of the branches and examine it attentively; it then inclined its ears forward, and applying its nose to the bark he struck it rapidly with his curious second finger, as the woodpecker strikes the tree, though with much less noise. From time to time he introduced the tip of the wire-like finger into the worm holes, as a surgeon would his probe. At length he came to a part of the branch which evidently afforded an interesting sound, for he began tearing it with his strong teeth. He soon tore off the bark, cut away the wood, and exposed the hole of the worm, which he delicately extracted with his wire-like finger and conveyed up to his mouth. I observed his movements with much interest, and was struck with the wonderful manner in which this animal is provided with the means adapted to his habits; first, the fine sense of hearing, which enables him to distinguish the different sounds produced in the wood by his light tapping; then the delicate smell which doubtless assists him in his researches; his secure step over the flexible branches, to which he clings by means of his four hands; his strong gnawing teeth, by which he tears the hardest wood; and, lastly, the curious little finger, which he uses in turn for so many purposes.

The Hybrid between Horse and Deer. — Have you or any competent zoologist examined the animal now shown in London, purporting to "combine the species of the deer and the horse?" Is it the same animal that was alleged to have been found in the New Forest a few years ago, and that was figured in the 'Illustrated London News.'—*George Guyon; Ventnor, Isle of Wight, April* 4, 1860.

Birth of three Bears at Clifton Zoological Gardens. — A very interesting and curious addition has lately been made to the animals in the gardens of the Society, by the birth of three young bears. Not that there is anything unusual in the circumstance of bears of the same species breeding in confinement. Those kept in the fosse

at Berne did so often, and instances in this country are common enough, but what appears so strange in the present case is the fact that the parents are of entirely different species, the male being the American black bear (*Ursus americanus*) and the female the brown bear of Europe (*Ursus arctos*), there being also other circumstances known to naturalists which make the present case still more strange and uncommon. Green, the head-keeper, with his long-life experience of animals in menageries, has never known or heard of a case of the kind occurring elsewhere. It will be curious to see what the hybrid little beasts will be like when full grown. At present two seem to take after the mother, and the third has the black coat of the sire; but, according to Green, it is impossible to say what colour they may take hereafter. The cubs at their birth, in January last, were no larger than pointer puppies, and even now at six weeks' old, are not so large as a Newfoundland puppy of the same age. They are like almost all young things, pretty and playful, and full of uncouth little antics; they are, too, by no means shy, and will follow Green's little boy like dogs. Madame Bruin and her infant family will doubtless be a great attraction to the young people during the coming summer.—*The 'Western Daily Press,' March* 29, 1860.

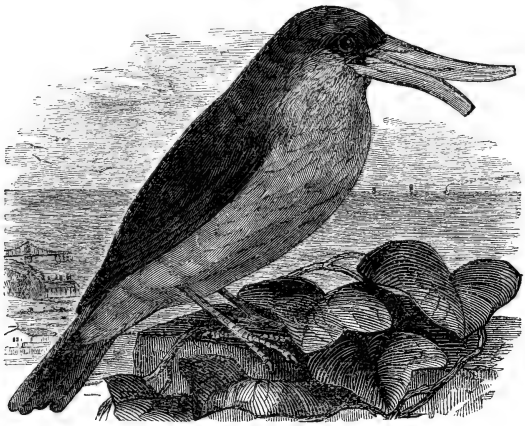
Wild Fowl in the Ornamental Waters of London. — Mr. Hussey is in error in supposing that no real wild fowl visit the ornamental water in the London parks. Some little time since I resided in London several years during the winter and spring, and have not unfrequently seen a small flock of perfectly wild pochards (*Anas ferina*) swim on the water in the Regent's Park; they sometimes remained for at least a fortnight: when they first arrived they were very wild, but soon got quite tame, and would occasionally take bread with the other ducks. One of the park-keepers told me that small flocks of wild fowl passing over frequently descended, and remained for a time on the water. A male wild wigeon (*Anas Penelope*, Linn.) for several successive seasons remained on the water in the Regent's Park, and paired with a female of the common wild duck (*Anas Boschas*, Linn.). When I lived in London some of their progeny used to fly backwards and forwards from the lake in the Park to the pond in the Botanic Gardens. — *H. Harpur Crewe; Wickham Market, Suffolk, March* 30, 1860.

What is the use of the Oil-gland at the base of the Tail of Birds?—In his 'Essays on Natural History' (pp. 60—64), Mr. Waterton is very severe on those who maintain that birds "use oil from glands for the purpose of lubricating the surface of their plumage," particularly objecting the impossibility of doing this to the head and neck. I possess no means of referring to the 'Essays,' but will give the substance of notes made (as specially therein), just after I had read the work, in August, 1841. It would be somewhat difficult for any one to prove the actual fact that a bird "procures oil from the gland with its bill," &c. (p. 61), since that perhaps could not be decided even by shooting the bird in the very act of pressing the gland; but it is surprising that so close an observer of the actions and habits of animals should not have noticed proceedings which, at the very least, strongly countenance the opinion Mr. Waterton so positively impugns. Few persons comparatively enjoy the opportunity of making very near and accurate remarks upon birds in a state of nature, and I profess to have

seen only what almost any one else may see; still I must assert that, long before I became acquainted with Waterton's 'Essays,' I was fully convinced of the fact which he there denies. Domestic ducks, when kept near a house and treated kindly, will fearlessly perform their toilet within a very short distance of any one they are familiar with. Thus I have often watched ducks preening themselves with perfect composure only three or four yards, perhaps less, from me, when I could distinctly perceive that they inserted the bill among the feathers, with a motion precisely such as if gently compressing the gland upon the rump in order to squeeze out some of the oil, after which they resumed the operation of dressing themselves. This seemingly lubricating process was often repeated, and the effect was imparted to the head and neck (which Mr. Waterton considers a bird cannot reach for this purpose) by a very simple but methodical manœuvre. The beak, having been directed to the oil-gland, is next used —as if to discharge its contents—upon the feathers of the back, when the head and neck are thoroughly rubbed over the spot, which the length and flexibility of the neck enable the bird to do, so as completely to apply it to every part except the forehead, the plumage of which I remember noticing in the duck to throw off water less than that of any other part. The conclusion drawn from such observations was fully confirmed by others upon a caged canary. These notes, though penned in 1841, were indited from memory, it is true, but I feel quite confident as to the general accuracy of my recollections. I do not, however, desire dogmatically to affirm the certainty of my inferences, particularly in opposition to a naturalist of such skill and varied experience as Mr. Waterton; I would only invite readers of the 'Zoologist' to employ their opportunities in endeavouring, apart from all theory, either to establish or to refute the opinion I have expressed. I have taken for granted that the gland upon the upper side of the rump of a bird contains an oily matter, because that fact will be evident enough to any one who only opens the gland of the fowl he has been eating. To account for only now producing reflections made nearly nineteen years ago, I can only say that the 'Zoologist' did not then exist, that the subject was not always borne in mind, and that, when it did recur, I hesitated whether or not to offer my notes for publication.—*Arthur Hussey; Rottingdean, April* 17, 1860.

Occurrence of the Wood Warbler (Sylvia sibilatrix) *near Penzance, and Note on the Migratory Warblers.*—After a careful attention to the different migratory warblers affecting this neighbourhood for the last twenty-five years, I have during the past week, for the first time, discovered the wood warbler near this place, and in full song, that is, uttering its thrilling sibilous song, and at intervals those very peculiar mournful chirps entirely different from its other song, and which might easily be attributable to another bird by those unacquainted with this bird. At present, we are unacquainted with the nightingale, lesser whitethroat, garden warbler, reed warbler and common redstart; it is, however, by no means improbable that in the course of time I may have to record the appearance of these birds, for by some curious and inexplicable law many birds unknown in a district make their appearance all at once, and continue ever afterwards to affect the localities. In illustration of this I may mention the blackcap warbler and the common willow wren, species unknown here thirty years ago, and now found in most of our groves and plantations. I should mention that the above-mentioned birds, except the nightingale, have been captured at Scilly and in this neighbourhood during the autumnal migration, apparently *in transitu*, especially after strong opposing winds, and I may include also the pied flycatcher, but they have not appeared with us as summer visitors.—*Edward Hearle Rodd; Penzance, May* 10, 1860.

Remarkable Monstrosity in the Beak of a Sparrow.—The engraving below represents a sparrow caught in King Street, Brighton, in June, 1857; it was in a state of perfect health and very fat, and was brought to Mr. Swaysland, the bird-stuffer, who had several times observed it flying in the neighbourhood, from a stable yard, and with the appearance of an ear of wheat in its beak. I am indebted to Mr. Bond for the loan of the specimen and the opportunity of having the very characteristic drawing, made by Mr. Willis. The limits of the proper beak are very clearly defined, and it is difficult to conceive how the supplementary portion of the beak could have been formed while the true beak was in constant use as a pecking instrument.—*Edward Newman.*



The Sea Serpent.—(See 'Liverpool Daily Post,' quoted Zool. 6985).

I've a story to tell—I don't say that it's true—
But just as I heard it I tell it to you.
A ship there was sailing upon the blue sea
With her canvas all set, when the captain, said he—
"I feel that the vessel is all of a tremble,
A sort of sea earthquake it seems to resemble;
Send forward the mate to see what is the matter."
When lo! what he saw would have made your teeth chatter,
An enormous big snake rising out of the sea,
Some three hundred feet long it might possibly be,
Aud in bulk it might equal a "wide crinoline"
(At least seven yards round that description must mean).
With jaws eight feet long, and with eyes fiercely glaring,
A horn and a mane, he looked horribly daring,

While the bowsprit he shook in his terrible mouth.
('Twas in Latitude East and in Longitude South,*
The ship making six knots—leaving foam in her wake,
Yet she stopped at the touch of this wonderful snake);
And the jibboom and bowsprit were snapped like a straw;
But his strength was outdone by his marvellous maw;
For he swallowed the stay-sail and also the jib
Like a boy gulping oysters—they went down so glib.
With this stay to his stomach he turned him about,
And gave with his tail such a vigorous flout
That some timbers to atoms were crushed by the blow,
And what more might have happened we none of us know,
When an object appeared for the which he set sail,
And both object and story were much like a whale.

—*George Guyon; Ventnor, Isle of Wight.*

Note on the Piscivorous Propensities of the Common Carp.—A specimen of the common carp, between five and six inches in length, was lately observed to devour three small minnows, each of about an inch and a half in length, which were confined in the same aquarium with him. One of these the carp seized immediately the minnow was placed in the aquarium, and swallowed it whole, head foremost. This habit of the carp is new to me, and may perhaps be worth recording.—*J. H. Gurney; Catton, Norfolk, May* 7, 1860.

Note on the Syngnathidæ or Pipe Fish Family.—The Syngnathidæ are most remarkable in their structural characters from all other fishes, forming an order, Lophobranchii, from the singular character of the gills, which are not pectinated, nor in equal laminæ, but disposed in pairs, in small tufts, a peculiarity not existing in other fishes. Their bodies are very slender, much tapering towards the tail, almost destitute of flesh, and covered with plated scales; they have a natatory bladder, and a tubular muzzle or snout, formed like that of Fistularidæ. In the British seas and in the coasts of Ireland we have six species:— two marsupial fish, having true caudal fins, Syngnathus Acus and S. Typhle; four ophidial, which contain S. æquoreus and S. anguineus, having each a rudimentary caudal fin, and S. Ophidion and S. lumbriciformis, in which there is no caudal fin, the tail terminating in a fine point. All these species are exceedingly common in the harbours and estuaries of the south-west coast of Ireland; and another of the Syngnathidæ, Hippocampus brevirostris, has been taken in Smerwick harbour, coast of Kerry. Of the marsupial species, S. Acus and S. Typhle are plentiful in Dingle Harbour in the spring and early months of summer, frequenting stony ground abounding with Algæ, in depths of four to six feet, where the development and protection of their ova can be accomplished. I have frequently taken both species in states of spawning, the S. Typhle with the young partially extricated from the ova, freed from the subcaudal pouch of the male, and actively swimming, whilst

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* "Latitude 12° 7″ East and Longitude 93° 52″ South."

This is somewhat obscure, but I think, on the whole,
It occurred t'other side of the Antarctic pole.

other portions of the ova in the pouch were not matured. These two species having a true caudal fin exercise it as a propeller, similar to other fishes, not being prehensile as in the other sections. The manner of passing the ova to the marsupial bag of the male fish is singular. In shoal water or a low tide these fish may sometimes be seen in pairs, side by side, apparently stationary on some rocky stone. At this time the ova—the capsules but imperfectly matured—are liberated from the female, and received into the abdominal sac of the male, the male fish having the power of expanding the lappings of the sac, and attaching the ova by a highly viscid or glutinous secretion. In time, as the process of maturation advances, the capsules of the ova enlarge, forming hemispherical depressions in the sac, and eventually the pouch is forced open by the full development of the ova and extrication of the young. In the other species, the genus Nerophis of the last edition of Yarrell and the Ancestra of other authors, the male fish are destitute of the abdominal or caudal pouch, and, unlike the last, have scarcely any caudal fin, their long tapering tail enabling them to twine around and cling to the stems of the larger Algæ. In Dingle Harbour the S. æquoreus may be met with very abundantly in the summer months, spawning in the months of June and July. This is the largest and most beautiful of the species, the girth of the body being oval, of a long tapering form to the tail, the colour of a beautiful fawn tinged with orange, and marked with numerous pale yellow rings. The irides are dark, tinged with yellow. In the female fish the abdomen is keeled, in that of the male depressed. A similar process as to the transfer of the ova takes place in the fish as described in the last, with the exception that the males have no abdominal sac to enclose the ova. These fish, under favourable opportunities of calmness and of tides, may be seen side by side clinging with their tails to the tufts of Zostera marina, in which position the male is enabled to attach to the abdomen the ova, by the same influence of viscid secretion alluded to in the marsupial species. This kind of depression in the abdomen of the male is clearly shown in the specimens of S. lumbriciformis, and in which the ova, attached in three rows, is seen. The S. anguineus and S. Ophidion are similar in habit to S. æquoreus, frequenting the same localities in the spawning seasons, and agreeing in other characters and peculiarities, with exception that the larger species are sometimes found in very deep water, at periods when not spawning. The S. lumbriciformis is more frequent in rocky pools under stones, and is the smallest of British pipe fishes. It is extensively distributed round our coasts, and is remarkable for its beautiful markings, especially about the head, of wavy bars, and with white spots along the length of its body. The irides are reddish. It spawns and perfects its young in July. I regret that I did not obtain the recent specimens, to have examined the interesting novelty, certainly first detected and described by Dr. Corrigan, of the manner in which the fish in feeding exercises a power for the inflating of the pouch or gullet, and the expansion of the jaw and mouth. I was aware of the singular manner of the distending of the throat and mouth of the dory (*Zeus Faber*) in receiving its food, and of singular peculiarities in Centriscus and in the Capros Aper, but the power in the Syngnathus appears altogether new, and seems analogous to the peculiarity in the vesicular inflation exercised by the hyoid bone in the howling monkeys, which communicates with the larynx, and produces the sound which gives the appellation to the animal. It is quite obvious how necessary are practical investigations in the living state to arrive at any accuracy in the characteristic habits of animals, and hence have resulted the observations of Dr. Corrigan. I should have mentioned that I have noticed S. æquoreus greedily stripping the stems of Zostera

marina of the young of Anthea Cereus, which were attached in a semiglutinous state. —*William Andrews, Dublin, May* 1, 1860.

A Day among the Cryptochitons.—The gale is over. I land on a warm calm day in the bight of the bay, and the contrast between the clear sunshine and smiling aspect of the green shore and the late raging sea and driving spray is very grateful. The sandpipers are quietly busy probing for worms in the saturated spongy soil; one very pretty species, with broad webs to his feet, is hovering about the surf chasing flies, and even swimming leisurely about in the water; the cormorants are dressing their coarse plumage on the rocks; the black-tailed gulls are sporting over the now tranquil sea; and the inland pond, where the water-fowl used to hide, is twice its original size, so that the rushes no longer conceal the timid wigeon ducks and teal. The little streams are swollen into small torrents; the shingle is tossed up upon the grassy plain; the rushes are swept over and torn up by the roots; the outline of the beech is even altered, and, to show the force of the wind and the violence of the sea, thousands of large mussels in bunches and clusters have been wrenched from their anchorage on the rocks, and thrown up high and dry upon the strand. Crossing a narrow promontory, I descend the cliffs on the other side and reach the seaward shore. I find myself in a small bay,—high, jagged limestone pinnacles and huge vertical-seamed cliffs hedging me in and bounding the view on either side, and in front the open treacherous main. The first objects I notice are prodigious masses of tangle, or Laminaria, thrown up in heaps, and hundreds of the large tunicated curious Cryptochiton Stelleri, detached by the gale from the off-lying submerged rocks, and cast, like shipwrecked sailors, on the shore; dashed against the cliffs and ground by rolling boulders, their internal valves are mostly crushed, and here and there their mangled bodies are found, having been carried to the tops of rounded stones, and their bones picked clean by sea-birds. I walk, solitary and musing, up and down the bay, throwing mutilated Chitons by dozens into the sea, and am rewarded now and then by finding one tolerably perfect. Several specimens of the large Octopus—possibly the rather apochryphal O. chinensis—are cast ashore, and afford me an opportunity of securing the horny mandibles, the rudimentary skull, and some of the suckers from the arms. One I measure is six feet from the tip of one arm to the tip of the opposite arm. The large eyes are covered with the skin, with the exception of a very small round aperture; the body is black-brown and minutely granular. Large skate, rock-cod and other fish have shared the untimely fate of the cuttles, and are lying dead and bruised among the stones, and fragments of the giant Lithodes (like the one I lately sent to the British Museum) strew the narrow strips of sand. It was an impressive scene, and remains indelibly stamped upon my memory.—*Arthur Adams; St. Vladimir Bay, Manchuria, September* 12, 1859.

Crustacea casting off their Legs.—Is there any reason known for the habit that hermit crabs so frequently indulge in of casting away their limbs? It is a popular belief among fishermen that lobsters throw off their claws from the fright occasioned by a thunderstorm or the firing of heavy guns, but the hermit crabs part with their members without any apparent cause of alarm, and sometimes continue to do so for

three or four days. A few weeks ago I noticed a small specimen had thrown off both the large claws; it of course remained in that condition many days, during which it took the food offered it, but with difficulty, from the want of the usual implements to convey it to the mouth. A few days ago it cast its shell, and is now again furnished with claws. The following note on the same subject was made more than a year ago. In the month of February a soldier crab, which had not been very long captured, cast away one or two of its legs without any apparent cause; in a day or two after a few more were discarded, together with the bigger claw, and after a similar interval the remaining limbs followed. The legless crustacean then left its shell and rolled helplessly about the dish. I pushed the shell to it, but could not get it to re-enter; it did not seem to have the inclination, and without assistance certainly not the power, as it lay on its back twiddling its feelers as its only amusement. In two or three days it seemed to have changed its mind, and on being helped to its shell took to it readily, and remained therein for ten days or a fortnight, when all further observation was ended by the dish being too long exposed to the sun, and the constitution that cared nought for the loss of arms and legs succumbed to the want of a parasol. The spawn was deposited at the same time that this specimen parted with its limbs, but no connection may exist between the two actions.—*George Guyon; Ventnor, Isle of Wight, May* 9, 1860.

Situation of Pyrgoma.—At Zool. 6994, as elsewhere, I find Pyrgoma spoken of as seated on the lip or "margin of the corallum of certain Caryophyllaceæ." A specimen of Caryophyllia Smithii now in my possession has two Pyrgomæ situated on the same fragment of rock, close to the base of the Madrepore.—*Id.*

A Glimpse of Mull and its Fauna. By ALEXANDER SOMERVILLE, Esq.

LAST summer, early in June, we enjoyed a pleasant excursion to the Highlands of Scotland. A notice of some entomological observations made by us on our journey from Glasgow to Oban, appeared in the 'Intelligencer' of September. In the present paper we propose to give a short account of our visit to the island of Mull.

After spending about ten days in the neighbourhood of Oban we started, taking the road leading to the pretty Sound of Kerrera. When we had proceeded a little way, we followed the path which runs along the cliffs overhanging the shore, and had the pleasure of seeing the little speckled Ennychia octomaculalis "spinning along" as Mr. Birchall describes it at Killarney. Melitæa Artemis was extremely abundant; we came on a female carelessly depositing eggs among the short grass on Tormentilla stalks. Zygæna Filipendulæ was booming along with its heavy flight in the bright sunshine. We were unfortunately too soon for Zygæna Minos.

The next object of attention was a pool, the surface of which was overspread with a species of Potamogeton. Here, after a few skims

with the bag net, we succeeded in taking a number of Donacia cincta.

Time, however, did not permit of a lengthened stay; we had much before us; moreover, the uncertainties of the future began to cast their shadows on us, for as to our resting-place for the night all was obscure, save that our dormitory was to be somewhere on

"Mull's mountain shores."

On our way to the small stone pier we picked up on the shore several snow-white Pecten niveus. This bivalve may be had, although somewhat sparingly, in the neighbourhood of Oban, at low tide. Its range does not appear to extend much further south than Oban; we have never observed it in the Firth of Clyde, although the coasts of that beautiful estuary have been frequently and carefully searched, and though the dredge has been used in deep water.

After a few minutes spent in crossing the narrow sound we were on Kerrera. This isle is interesting as the scene of the death of Alexander II., King of Scotland, when on an expedition against the Western Isles, then under the dominion of Norway. We took the road which leads to the western shore of the isle. On our way we found Lycæna Alsus in profusion in several spots. This species seems to be somewhat local in the west of Scotland, but is not rare in the localities where it occurs. Here also appeared again our old friend Macroglossa bombyliformis darting along the heathy hillsides, but the specimens were very much worn, and were not to be compared with the handsome and freshly-emerged ones which we had taken behind Oban.

What a view burst on us as we reached the highest part of the road! On the east the two-peaked "Cruachan Ben," whose lofty summits we had so lately scaled, rose majestically, while "Jura's rugged coast," "Mull's dark headlands" and "Morven's shore" lay to the west. Northward the green isle of Lismore, with its picturesque lighthouse, filled the eye. We were soon on the beach, where the ferry boat for Mull awaited us. The day was splendid, and the air so still that our two pilots waved the use of the sail and rowed us across the channel—six miles in an open boat. We had Her Majesty's mail bag for our fellow passenger. The sea was covered with guillemots, puffins and sea-fowl of every tribe, which, as we approached them, rose in flocks and sped along in single file at no paltry rate, in some cases not six inches from the surface of the water.

On landing we took the road south and came to a large peat moss. Here we found Campylus linearis sparingly, Melanippe hastaria in

abundance, also Ennychia octomaculalis again. Nemeophila Plantaginis was careering madly about, contrasting strangely in its flight with the slow zigzag movements of Chortobius Davus, which delights to dance up and down among the heads of the cotton-grass.

We soon reached the mouth of Loch Spelvie. The problem, however, which had to be solved was—Given, Loch Spelvie with a tide running at six miles an hour, how to cross it. The practical solution proved rather a difficult affair. There was no one of course on our side of the Loch, and it was only after the most protracted "singing out" and shouting that we gained the attention of the gentlemen of the opposition.

For the friends of Crustacea we may mention that several large Maia Squinado were lying among the stern-sheets of the boat.

The next and last part of the day's programme was a walk of four miles along the shores of the peaceful Loch, at the head of which we were told there was a hospitable farm-house. This domicile we reached some time after the sun had set behind the purple-tinged hills of the west.

Next morning we were early astir, and after a breakfast of the homeliest character prepared ourselves for a hunt among the heights. The grand object of the day's enterprise, and that which we made up our minds, by hook or by crook, to attain, was the capture of Dytiscus lapponicus, a species which but a year or two ago was pronounced by Mr. Clark to be new to Britain. The morning was exquisite; we were soon clambering over rocks and heath. We came upon several specimens of Carabus glabratus, one devouring the dead pupa of a dragon-fly. Carabus nitens also gladdened our eyes. Every now and then Bombyx Callunæ went tearing past as if on some behest of weal or woe.

Reaching an eminence we descried a deep mountain tarn at some distance; thither we betook ourselves with all speed. How Dr. Hagen would have revelled in the multitudes of Phryganidæ which tumbled about everywhere near the margin of the Loch. We took a newly-emerged specimen of Anax formosus, which we have identified from the description of the 'Annual' for 1857. In the Loch itself Hydroporus halensis (*Fabr.*), H. erythrocephalus, Agabus arcticus and Gyrinus minutus were not rare. Though these species were very good we sighed after something better; but our wish was not to be gratified for several hours. After visiting many Lochs we came to one which looked likely to contain something good. We proceeded in different directions, and began to walk round the edge. At last—"Ah!—there is

something large coming to the surface to breathe—dive—up with the net—he is in—lapponicus for ever!" We need not say that what we had taken in no way cooled our ardour; our search became more exciting, and our labours were not unrewarded, for before leaving the high ground we had the satisfaction of bagging a somewhat creditable number.

On our way down we came on some patches of birch wood in which Melanippe hastaria was actually in profusion, and as the light breeze swept past there was frequently a perfect swarm of them on the lee side of the tree. We noticed that they were generally more numerous round the mountain ash than the birch.

Returning to our Highland shieling we sallied out in the afternoon to take a survey of the low grounds. We came to a loch, which, in some places was margined with tall marsh grasses. There several species of Donacia were luxuriating in the axils of the stems; D. Menyanthidis, D. Proteus, and another which we had the gratification subsequently to find proved to be a species new to Britain, namely, D. obscura of Gyllenhal, not Stephens. By sweeping in the water under the grass-stems Orectochilus villosus came up in the net.

As an illustration of the fact that science and the business of common life go hand in hand, we may adduce the example of our having breakfast next morning much improved by a dish of trout caught in our Coleoptera net.

Having to cross the island to catch—not a floating Dytiscus lapponicus—but the steamer, we strapped on our knapsacks and started. The road at first lay through a birch wood; here we took Leptura quadrifasciata flying along in the sunshine. Our next business was the ascent of a lofty height, the view from whose summit we cannot stay to depict. It embraced a large portion of the Highlands of Scotland and of the Western Islands from Arran to Skye, including

> "Ulva dark, and Colonsay
> And all the group of islets gay
> That guard famed Staffa round."

But of the hill itself and of the landscape immediately connected with it no better description can be afforded than that given of another by one of our Scottish minstrels.

> "Here—above, around, below,
> On mountain or in glen,
> Nor tree, nor shrub, nor plant, nor flower,
> Nor ought of vegetative power
> The weary eye may ken.

For all is rocks at random thrown,
Black waves, bare crags and banks of stone,
As if were here denied
The summer sun, the spring's sweet dew,
That clothe with many a varied hue
The bleakest mountain side."

Several Hadena Pisi flew past us as we stood on the cairn. In a shallow pool near the summit Hydroporus halensis and Agabus congener were tolerably common. In coming down the hill-side we observed Scopula alpinalis and Eupithecia pumilata. After reaching the base we had a walk of twelve miles, part of which was occasionally enlivened by a pell-mell chase after Bombyx Rubi.

In the evening we reached Craignure on Mull's "dark Sound," where next forenoon we were received on board the "Clansman" by her hearty and courteous commander, Captain Graham. Our voyage conducted us to Stornaway in Lewis. The whole of our Highland trip was one of much enjoyment, and everywhere we had to acknowledge God's preserving care of us. But our limits compel us to bring these remarks to a close.

ALEXANDER SOMERVILLE.

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Capture of Deilephila lineata at Brighton.—I had the pleasure of setting out this week a pair of Deilephila lineata, male and female. The first was captured by a boy on Saturday morning last, the 12th inst., not a hundred yards from where I live, and taken to Mr. Swaysland, naturalist, Queen's Road. The second was taken by Mr. Swaysland himself, in his garden just outside the town, on Tuesday morning last, the 15th, inst., who sent them to me to set out. Mr. Bond saw the last one alive, and identified the species. I believe there cannot be the slightest doubt of their being truly British specimens.—*Thomas Thorncroft;* 87, *North Lane, Brighton, May* 17, 1860.

Deilephila lineata.—A fine specimen of this insect has just been brought to me to set out; it was taken near here, at rest among some grass and weeds in a hedge, and, from its appearance, cannot have left its pupa-case more than a couple of days.—*J. Hellins; Exeter, May* 14, 1860.—*From the 'Intelligencer.'*

Deilephila lineata.—On the evening of the 13th I succeeded in capturing three specimens of this insect hovering over the flowers of the white Narcissus, their flight being precisely like that of M. stellatarum.—*R. M. Stewart;* 3, *Park Place, Torquay, Devon, May* 14, 1860.—*Id.*

Larva of Tulæporia pseudo-bombycella carnivorous.—On the morning of the 23rd ult., whilst sorting over the Micro larvæ I had collected at West Wickham the previous day, I observed a larva of Talæporia pseudo-bombycella. Not having brought home any fresh lichen I put the larva into a jar containing four females of Diplodoma marginepunctella. I should here observe that this jar, previous to the introduction of the

T. pseudo-bombycella larva, only contained a small piece of lichen, four females of D. marginepunctella, and the cases from which the aforesaid females had emerged. On the 29th I took the jar down for the purpose of mounting the females upon card, when, to my surprise, I found that the T. pseudo-bombycella larva had devoured them, and on closer inspection I observed it had decorated the top part of its case with the skins of its victims. In order, if possible, to observe its carnivorous propensity, I placed it together with a dead Micropteryx purpurella in a pill-box, and, upon opening the box at about ½ past 4 P. M., I perceived it had got the dead M. purpurella in its jaws, and was eating it. On the 7th inst. I put four more larvæ into a jar along with a dead house-fly and a woodlouse. One larva instantly commenced operations upon the stomach of the woodlouse, where it remained until I unfortunately disturbed it on the evening of the 9th inst. The other larvæ, however, evinced no desire to eat either the lichen or the insects, but crawled up the side of the jar, and being full-fed spun up.—*Charles Healy; 74, Napier Street, Hoxton, N., May* 14, 1860.

Food-plant of Œcophora tripuncta.— In answer to one of Mr. Miller's inquiries respecting the habits of the various Micros mentioned by him, I beg to inform him that both Mr. D'Orville, of Alphington, and myself bred Œcophora tripuncta. The larvæ were found by Mr. D'Orville feeding on a bunch of dried mint, hung up in an out-house. Mr. D'Orville very kindly gave me some of the pupæ, but I had not the larvæ. I have no doubt but Mr. D'Orville can furnish us with a description of the larvæ. The habits of this species appear to resemble very closely that of Endrosis fenestrella in eating the leaves and stems of dried plants, or, in fact, being omnivorous.—*Edward Parfitt; Museum, Taunton, May* 11, 1860. PS. I find by reference to my notes that Œcophora tripuncta came out June 10, 1859.—*E. P.*

On the Capture of Dermaster Blaptoides in Japan.—As I am in a good humour, having just fished up a new genus of Mollusca from a pretty good depth, I will tell you, at the risk of being tiresome, all about it, as I am sure Adam White, at least, will be interested in the narrative. I was walking solitarily, for all hands had gone on board to dinner, along the shell-strewn strand of Taleu-Sima, a jolly little island, not far from the shores of Niphon,—walking along in a brown study, smoking a little clay cutty-pipe, and thinking chiefly of the contempt in which I should be held if some of my "very particular" friends saw me in my disreputable "rig," for my neck was bare, my coat was an old blue serge, and as for my hat it was brown felt, and I must say a "shocking bad one." However, the sun was bright, the clear blue rippling sea was calm, the little island was new and verdurous, and I smoked serenely. On a sudden my abstract downward gaze encountered a grotesque Coleopteron, in a suit of black, stalking slowly and deliberately among the drift-wood at my feet, stepping cautiously and delicately over the spillican twigs, like a Catholic priest in a crowded thoroughfare. At once I knew my Coleopterous acquaintance to be Dermaster Blaptoides, for although my eyes are small, yet I have been assured by a young lady friend of mine, sometimes irreverently called "Polly," that they are penetrating, and my friend Adam White, when he warned me not to neglect my "Carabs," had sent me a rough outline of the "corpus" of Dermaster. So I carefully lifted my unresisting sable friend from his native soil, and, after giving him a good long stare, I deposited him in a bottle. From his name and appearance I judged him to be cousin to Blaps, and I turned over the rock-weed for his brothers and other relations, but though Helops was there, Dermaster was not. Puzzled, but not baffled, I conceived his tastes might be more particular, so I ascended the steep green sides of the island, and cast about for rotten

trees, nor was I long in discovering a very promising stump, nicely decayed, and full of holes enough to captivate the heart of any beetle. Being, however, fatigued with my scansorial efforts, I sat down before the citadel of the Dermaster, and assisted my deliberations by smoking a solemn pipe. Having propitiated Nicotiana and matured my plan of operations I commenced the work of destruction, when, lo! among the vegetable *débris* I described a long dusky leg, anon two more, and then, buried among the ruins, the struggling Dermaster. In this manner was the rarest beetle known captured by a wandering disciple of Æsculapius and an eccentric Fellow of the Linnean Society.—*Arthur Adams.*

On the Capture of Carabi in Manchuria.—Some "innocent" not yet versed in the deep mysteries of beetle lore, and not inured to the toils of beetle-hunting, who may never have seen as I have the indefatigable Doctor Power on his stomach in a ditch, spectacles on nose, and the perspiration streaming down his cheeks with his fossorial exertions; such complacent "know-nothing" may imagine that because I have some thousand beetles nicely carded in my store-box that I have only picked them up, and only put them down. To such young person I can severely answer, You are quite mistaken. Take, my friend, those great carnivorous ground-beetles, for instance the Carabi. Could you but see certain enthusiasts (for I had imbued many with the love of beetles) rushing wildly over the boulders and large flat stones in dried-up water-courses, at the "imminent deadly risk" of bruised shins and sprained ankles, eager in the pursuit of tantalizing, active Cicindelæ, or could you but mark their progress on the plain by huge stones upturned, or witness their frantic struggles and torn habiliments in the scrub along some beach-fringing belt of trees, you would certainly, my dear young friend, modify your opinion. Come with me; we are in Manchuria (spelt all kinds of ways, and vulgarly called "China Tartary"); we land in a ship's boat, and are left to the tender mercies of the mosquitos and bears. I put the gnats first because their name is legion, and their torment is nearly unbearable; but the angelic bears are "few and far between;" in fact, although I may have several of their skulls, I only had a good look at one, and he escaped with his valuable life, though several of us thirsted for his blood. We push our way breast-high in tangled brushwood, long hard grass and creepers and bamboos up the sloping sides of the sea-skirting hills, and when we reach the top we find it comparatively level, and instead of breast high in brushwood, it is knee-deep in flowers—peonies, monkshood, Hoteras and Campanulas; the trees are large, and there is more animal life astir. The pied woodpecker is scrutinizing the whereabouts of grubs, and giving now and then an inquiring tap, while the little striped ground-squirrel plays at hide-and-seek among the branches of fallen trees. The head of a startled deer may be seen for an instant (a long brown nose and two great inquiring eyes), and then a portion of his other extremity, as he bounds away in the dim vistas of the trees. But I am wandering; my business is beetles. One thing in this wild green wilderness of Manchuria is the prodigious number of charred and blackened trees that strew the ground in every direction, though often so overgrown with weeds that the way you become acquainted with them is generally more practical than pleasant, namely, by finding yourself on your face among the flowers, your shins barked and your temper ruffled. The phenomenon of the prostrate trees is owing to the wandering shooting and fishing parties of Manchoo Tartars, who always fire the scrub and burn down the trees, to clear the land and make it yield good pasturage. It is, however, under these burnt logs that Carabs "most do congregate;" and the labour it requires to dislodge and capture them is really no joke. Two small

bipeds (energetic withal, and determined) might be seen in this great wild hill-side, one at each end of an immense blackened log. By well-directed efforts, assisted by sundry encouraging exclamations, as "There! she moves," "Now then, Doctor," or "Again, again, again!" the log is turned over, and my amiable and worthy colleague, Sutherland, or my impetuous messmate, Buckley, will share with me possibly one or two fine Carabi; perhaps a neat black species with grooved elytra, perhaps the gorgeous Carabus intricatus in all his emerald glory, perhaps one equally as large, green and beautiful, with rows of beads on his wing-covers, or a small brown flattish species. Besides these you may bag a few specimens of Helops and Helops' cousin-germans, and sometimes a Dorcus or Lucanus will reward our persevering, praiseworthy exertions. But oh! what sweeps we look on our triumphant return! Our nether habiliments, now no longer white, are somewhat torn, our hands are decidedly "dirty paws," and our faces as smutty as the bottom of the family tea-kettle.—*Id.*

Opatrums and Sand.—We are at Hakodadi, in the island of Yesso. The day is fine and tempting, and the ship-worn naturalist is longing for a walk; for, believe me, the charms of Nature are very much enhanced after weary days of monotonous routine on board a ship. I trace the long, sweeping curve round Hakodadi Bay; long strings of horses carrying all kinds of merchandize pass me repeatedly: I buy a wicker-basket for an "itzelin," and fill it with skulls and shells before I get afloat again; and now the great object of my desire, Umbonium giganteum, a molluscous Trochidian, has been secured "in the flesh," and the remainder of the walk is devoted to beetles. I intend to cross the narrow, sandy isthmus connecting the two bays and follow the outline of the outer one. Far along the sandy beach I go, my soothing pipe inviting meditation, and eyes, that "to their earthy mother tend," intent on chalcedony, carnelians and nodules of marble, of which there are galore on the "beached margent of the sea." The sunken camp is passed, where astute Nipong men daily practise rifle-shooting, and near which tempting deposits invite inspection and reward the Coleopterist with a huge black Copris, an amethystine Geotrupes, and a singular Onthophagus with long recurved frontal horn, and where Euchloræ abound on the leaves of the young oaks. Vast mounts of white sand, covered with undulations like the ripples of the sea, drift-hillocks, soft and dazzling like heaps of snow, long wavy ridges, half burying the fishermen's huts and banking up the boat-houses; roses, large, blushing and fragrant, and Sedums with whorled succulent green leaves, and everywhere Opatrums. Rolling down the gentle sand declivities, or crawling painfully up the banks, under the dry, scattered shards of oxen and horses, under heaps of dead leaves, and by the snaky roots of brine-washed plants, there nestle scores and scores of gray-brown, rusty brown-black, rough-coated indolent Opatrums. Without much labour you may gather them by bushels, and leave as many for your friends. With the exception of their colour, which varies according to the amount of sand and dirt on their bodies, they are all alike as two peas, and tired, dusty and ungrateful, you come to the conclusion that all is—Opatrums and sand.—*Id.*

On the Capture of Dicranocephalus Wallachii in the Korea.—Forming one side of Chosan Harbour, in the Korea, is a green hilly island, covered with low trees, chiefly oak scrub, and full of loose moss-grown, lichen-covered, loose stones. In some parts the sides of the hills are furrowed by water-courses, where the wild pig feeds on the fallen acorns, and where the little hog-deer comes to drink. In other parts the broad base of the hill expands into grassy plains, where troops of horses graze, and where we find shallow scattered ponds, the favourite resort of sundry ducks and wigeons. It was

in one of the wooded ravines of this little island that Dicranocephalus was taken, and this is the true and particular history of his capture. I am ashore with the watering-party, and as usual on the alert for beetles. Net in hand I wander far away over the hill-side, beating now and then the oak-scrub for Balaninus and Apoderus, or bagging pretty Longicorns as they come flying by, or taking glittering Agrili and its allies as they pitch on the sunny oak-leaves; and this, by the way, is how the Buprestidæ may be caught. Old Turner may patiently dissect decayed stumps of hawthorn in the New Forest for Anthaxia, but if he had watched, net in hand, in the fern among the young oaks, he would have seen them shining in the sun. However, as I wander on, I "keep my weather eye lifting," as we say in nautical phrase. Now friend Buckley has an especial penchant for game of a larger kind, looking down secretly may be on beetles and "such small deer," so, gun in hand, he is on the trail of a buck. On a sudden I am aware that something of an unwonted nature has succeeded in astonishing the mind of my predatory companion, for "Doctor! doctor!" resounds through the gulley. Hastening as fast as untractable boughs and prickly twining stems of Smilax will permit me to the scene of excitement, I am agreeably surprised on beholding a strange great Coleopteron feebly struggling in a green bed of oak-leaves, and my friend of the fowling-piece gazing with surprise, not unmixed with alarm, at its unwonted aspect. I know him for a Goliath, and raise him carefully from his verdurous couch. Haply he has been flying in the sun round yonder cluster of fir trees near the top of the hill, and fallen, like Icarus of old, from his high estate. His body is covered with a downy bloom, like the sunny side of a ripe plum, and his head is adorned with two conical horns; hence his name, Dicranocephalus, or "he of the double helmet." He is very strong, and in his ways resembles Octonia and Melolontha. I read in 'Maunder' that one specimen, now in the British Museum, was taken on the Himalayan Mountains, so that my prize, if not indigenous to the Korea, must have travelled a pretty long way. Be that as it may, he is now carded (not barbarously transfixed by a pin), and graces my store-box, wherein are displayed many beetles of equal beauty, but possibly of less celebrity.—*Id.*

Chrysomela marginalis found on the Mainland of Caithness, N.B.—My son, William Betts Peach, found a short time since the above-named pretty beetle on the island of Stroma, in some numbers on the grassy slopes at the north end and west side of that island. On first seeing a specimen I called it the Royal Volunteer, from the red stripe running down each side of it. Not being an entomologist I sent specimens to Andrew Murray, Esq., of Edinburgh, who kindly named it for me, and added, "Common on the Continent, but Orkney is the only Scotch locality yet recorded." Stroma belongs to the county of Caithness, and thus with perfect propriety it could be claimed for Scotland; now it may be safely, for on Saturday last, the 28th inst., my son found it rather plentiful on Duncansbay Head, and the cliffs thence to near Freswick, on the mainland of Caithness.—*Charles William Peach; Wick, N.B., April* 30, 1860. [The insect is Chrysomela sanguinolenta of our cabinets.—*E. N.*]

Notes on the British Trichopterygidæ, with Descriptions of some New Species. By the Rev. A. Matthews, M.A.

Since the publication of my former paper on the Trichopterygidæ many very interesting additions have been made to the list of our

indigenous species. At that period, June, 1858, the curious group which I separated from the rest of the family, under the generic appellation of Ptinella, was represented in this country by a single individual of a species previously undescribed, and although as many as eight species were already known on the Continent not one of that number had appeared in these islands.

During the last twelvemonth a great change has taken place. Early in the season, at a meeting of the Entomological Society, Mr. Janson announced the capture of three of these much-wished-for species, *viz.*, P. ratisbonensis, P. tenella and P. angustula. I must here remark that we were in error with regard to the last-named species, P. angustula. While staying in Paris for a short time, in February last, I had the opportunity, through the kindness of MM. Allard and Fairmaire, of examining some of the French collections of Trichopterygidæ, and discovered that the species first taken by Mr. Janson, and subsequently by my brother, the Rev. H. Matthews, and myself, was not the true P. angustula of Gillmeister, but one which has been lately found near Paris by M.M. Reitche, Fairmaire and others, and described by M. Fairmaire under the name of denticollis. All the specimens taken by Mr. Janson were found in the early part of last spring, and in the course of the summer my brother and I were fortunate enough to meet with three fresh species, as well as specimens of denticollis already alluded to. They were again, by a curious coincidence, two apterous and one winged species, *viz.*, P. aptera, P. angustula (this time the true P. angustula of Gillmeister) and P. limbata; so that at the present date the British list includes no less than seven distinct species of this curious and highly interesting group, *viz.*:—P. britannica, *Matth.*; P. aptera, *Gillm.*; P. tenella, *Erichs.*; P. denticollis, *Fairm.*; P. angustula, *Gillm.*; P. limbata, *Heer*; P. ratisbonensis, *Gillm.* But by no means the least satisfactory result of the capture of these living examples has been the discovery of large and well-developed eyes in the species hitherto considered sightless. It always appeared to me somewhat incomprehensible how an animal unendued with sight could not only move with such surprising rapidity in any purposed direction, but also avoid the obstacles it met with in its path, as I have often seen these insects do. But the mystery is now solved; the many species comprised in the blind section of this genus, the "sans yeux" of the Faune Française, in reality possess as perfect visual organs as fall to the lot of any existing beetle,— the only peculiarity of these organs being the fact that they are concolorous with the other parts of the head, and situated mainly on its lower surface, a small portion only being visible from

above. The labium and other parts of the mouth also deserve some notice, exhibiting in many respects a great affinity to Deinopsis and other Brachelytrous insects. As I observed in my former paper, I think this family intimately connected with the Brachelytra. The well-known similarity of their habits, the high caste of their physical powers, the striking resemblance of their outward shape, and, as far as our present investigations reach, of the various organs of feeding and motion, all concur in placing them in close proximity to that extensive section. I am persuaded that this class is much more numerous than is generally supposed, and that many species are yet unknown. It is not a little remarkable that in the course of one year as many as six species of a genus, so long known and sought for by British Coleopterists, should have occurred for the first time in this country, but it is a fact which holds out abundant promise of future success; all the specimens of the past year were taken under the bark of decaying trees, and, where this habitat can be met with, I do not think the species of tree or the locality itself is of much importance; the collector must be furnished with a large amount of patience and perseverance, and then he need not despair of success. Besides the Ptinellæ the last season was productive of several novelties in the other genera of this family, two of which, Ptilium brevicolle and Ptenidium picipes are now described for the first time.

I had intended in this paper to have revised the whole list of British Trichopterygidæ, as much yet remains to be done before we can hope to arrive at a thorough uniformity of nomenclature; but for the want of reference to the works of some continental authors I am not yet able to do this effectually, and must, for the present, content myself with noticing a few of the most important corrections. The insect described in my former paper as "Pteryx mutabilis" has proved to be indentical with the the T. suturalis of Gillmeister, although nothing can be less descriptive of the animal than his figure, or more inappropriate than the name he has given it. I have also ascertained by comparison with the French collections that the T. mollis of Mr. Haliday is the T. fucicola of the continental authors; and as the latter name possesses the right of priority, it must in future be used to designate this species in our lists. It will, I fear, be also necessary to change the name of Titan, under which I separated T. abbreviatellus from the rest of the family, as that term is objected to on the score of preoccupation by a genus of exotic Longicorns. In lieu of Titan, therefore, I propose to substitute Elachys (ελαχυς), perhaps the

more expressive name of the two. The genus created by this separation may be characterised thus:

ELACHYS, *nov. gen.*

Trichopteryx, p. *Heer; Erichs.; Faune Franç. Alibert; Haliday.* Titan (*Newman*), *Matth. Zool.* 6110.

Antennæ articulis undecim, basali maximo cylindrico, secundo magno, orbiculato, sex sequentibus fere æqualibus, tribus ultimis majoribus, rotundatis, apicali acuminato; elytra abbreviata, quadrata, abrupte truncata; pedes breviores, coxis omnibus magnis, posterioribus haud laminatis.

Hoc genus multo magis *Ptilii* quam *Trichoptericis* formam gerit; ab illo differt elytris brevissimis, truncatis, et coxis dilatioribus; ab hac autem totâ formâ dissimili, et coxis haud laminatis.

Ptilium brevicolle, nov. sp. L. c. $\frac{1}{6}$ lin. Oblongo-ovatum, profundissime ac rugose punctatum, sparsim pubescens, piceo-brunneum, capite magno, tribus foveolis longitudinalibus in frontem indistincte impressis; prothorace transverso, lato, capite multo breviori, lateribus parum rotundatis, angulis obtusis; scutello magno triangulari; elytris haud truncatis, ad humeros prothorace angustioribus, posterius parum dilatatis; pedibus et antennis robustis, testaceis.

Hæc species singularis, capite magno, prothorace brevissimo et corpore rugoso ab omnibus aliis facillime potest cognosci. Capta prope Weston in agro Oxoniensi.

Oblong-ovate, very coarsely punctured throughout, pitchy brown, sparingly pubescent; head very large, with three obscure longitudinal impressions on the forehead; thorax transverse, wide and very short, not so long as the head, with the sides somewhat rounded and the angles obtuse; scutellum large, triangular; elytra entire, rather narrower than the thorax at the shoulders, but wider towards the apex; legs and antennæ very robust, testaceous.

This very distinct and curious-looking species is, with the exception of unusually minute examples of P. minimum, the smallest Coleopterous insect I have ever seen. It is more nearly related to P. Kunzei than to any other of the genus, but may be readily distinguished from them all by the peculiar shape of the head and thorax, and the extreme roughness of its punctation. A single specimen only has yet occurred, taken by myself in Oxfordshire some years ago.

Ptenidium picipes, nov. sp. L. c. $\frac{3}{8}$ lin. Ovatum, convexissimum, lævissimum, nigrum, punctis remotis per totum corpus notatum; capite magno, oculis prominulis; prothorace capite longiori, lateribus valde rotundatis, angulis obtusis; scutello magno, triangulari; elytris ovatis, prothorace parum latioribus, posterius angustatis, apicibus obtusis, ad apicem dilutioribus; antennis ac pedibus piceis, aut piceo-nigris.

A *P. punctato* forma ovata et convexissima ad distinguendum valeat; ab aliis antem puncta per totum corpus dispersa, atque membra nigrescentia hanc speciem indicant. Exempla nonnulla capta in Muscis prope Gumley vere novo.

Deep black, ovate, very convex and shining, deeply but very remotely punctured throughout; head large, with the eyes rather prominent; thorax rather longer than the head, with the sides very much rounded and the angles obtuse; scutellum large, triangular; elytra rather wider than the thorax, ovate, narrowed posteriorly, with the apex obtuse, rather paler towards the apex; legs and antennæ piceous or pitchy black, the latter rather darkest.

The curiously punctured surface of the body may, and I dare say has, confounded this species with P. punctatum, but it may be easily distinguished from that insect by its very great convexity and ovate and wider form, and also by having the disk of the thorax punctured throughout without the smooth space so conspicuous in P. punctatum. From the rest of the genus it may be known by the deeply punctured surface of the body and its dark limbs. It appears to be a very local species; I find it in moss in the early part of the spring, at one small spot near this village, but not elsewhere.

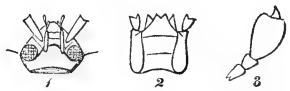
Besides the foregoing two other species were added to the British list in the course of last year, *viz.*:—

Ptilium cæsum (Erichson). Found rather plentifully by Mr. Gregson in ants' nests sent from Scotland.

Ptilium saxonicum (Gillmeister). Of this one pair were taken by myself near this place in June.

In order to give a more correct idea of the appearance and position of the eyes in the wingless species of Ptinella, I send a sketch of the under side of the head of P. aptera, as these organs are more conspicuous in that species than in the rest, but with a high power they may easily be discerned in all that I have hitherto examined, *viz.*, P. britannica, P. aptera, P. denticollis and P. angustula. I have also

added an enlarged view of the labium and adjacent parts. This dissection was obtained from P. denticollis, but the labium is similar in the other species.



1. Under side of the head of Ptinella aptera.
2. Labium, with the adjacent parts.
3. Maxillary palpus.

A. MATTHEWS.

Gumley, Market Harborough.
May 1, 1860.

Errata.— I must also call your attention to some errata in my last paper on the Trichopterygidæ, since, in more than one instance, these mistakes change the meaning of a whole sentence. P. 6106, line 4 from top, for "acuminata" read "acuminato." P. 6106, line 18 from top, for "exigua" read "exiguo." P. 6107, line 13 from top, for "determisset" read "deterruisset." P. 6108, line 6 from top, insert a comma after "differt." P. 6108, line 18 from top, insert a comma after "calcaratis."—*A. M.*

Note on Brachycentrus subnubilis of Curtis.—This insect has been very abundant here this spring, indeed swarming along both the banks of the river and the still waters of the canal. There appears to be some discrepancy between Stephens' diagnosis of this genus and that of Dr. Hagen; thus, Stephens gives "Tibiæ with a pair of short spurs at the apex; the intermediate and hinder pair with a second pair below the middle." Dr. Hagen gives 2, 3, 3; this is correct; but the Doctor has inserted a note (?) as to the number of joints in the maxillary palpi; he thinks two. The note of interrogation may be removed, as two is the number in the males, and three in the females. Now both the authors above quoted give June as the time of appearance for this species. I took them first about the middle of April, and they are now fast disappearing, so that by June I do not think there will be one to be seen. This locality it is true may make some difference as to the time, for more to the north, if possible, they are later in their appearance. The local names of this species I have ascertained tained from a fly fisherman. The male is called the "hare's flex;" this, I am told is from the fly-makers using the flex or felt from a hare to imitate this fly. The female is called the "granum," pronounced gran-um; this I hold to be a corruption of the word greenum, as it is given in consequence of the female having a large green egg attached to the apex of the abdomen, which remains attached until carefully deposited in the water, when it rapidly sinks to the bottom. I am somewhat inclined to think that Stephens had a different insect in view when he constructed his diagnosis, or I think he would not have made such a mistake in the number of spurs on the intermediate and posterior tibiæ; and in this I am somewhat borne out by capturing an insect similar to this, and agreeing with its generic characters, although I did not detect it until I had decapitated it and otherwise mutilated it in dissecting for the generic characters of the genus Brachycentrus. I then found the maxillary palpi

differed in the form of the basal joint; the apical joint is not pilose in front, but thickly pubescent all round; the spurs on the tibiæ are as Stephens described them, 2, 4, 4. The coloration of the wings is the same as B. subnubilus, and so nearly like it in other respects as to be easily taken for that insect without closer inspection; but I hope to take more of this species, and I will then give a full description of it. At the same time I should wish to draw the attention of entomologists to the fact that every "apparent like is not the same"— *Edward Parfitt; Museum, Taunton, May* 8, 1860.

Proceedings of Societies.

Entomological Society.

May 7, 1860.—J. W. Douglas, Esq., President, in the Chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'Fragments Anatomiques sur quelques Elatérides;' 'Fragments Anatomiques sur quelques Coléoptères;' 'Fragments d'Anatomie Entomologique;' 'Note sur l'Absence dans le Nemoptera lusitanica d'un Système nerveux Appréciable;' 'Description des Galles du Verbascum et du Scrophularia, et des Insectes qui les Habitent, pour servir à l'Histoire du Parasitisme;' 'Mémoire sur une nouvelle éspèce de Belostoma (B. algeriense) et Reflexions sur ce genre d'Hémiptères Aquatiques;' 'Recherches Anatomiques sur les Hyménoptères de la Famille des Urocerates;' 'Fragments d'Anatomie Entomologique sur les Buprestides, suivis de la Description d'une éspèce nouvelle de Cychrus d'Espagne;' 'Histoire Anatomique et Physiologique des Scorpions;' presented by the Author, M. Léon Dufour.' Naturgeschichte der Insecten Deutschlands,' Eister Band, Eiste Häefte; by the Author, Dr. H. Schaum. 'The Butterfly Number of Young England;' by the Author, E. Newman, Esq. 'The Zoologist' for May; by the Editor. 'The Literary Gazette' for April; by the Editor. 'The Journal of the Society of Arts;' by the Society. 'The Athenæum' for April; by the Editor. 'The Farm and Garden,' Vol. ii. Nos. 13, 14 and 15, containing papers on Injurious Insects; by the Author, C. A. Wilson, Corr. M.E.S. 'The Entomologist's Weekly Intelligencer,' Vol. iv. and Nos. 183—187; by the Editor, H. T. Stainton, Esq. 'Die Deutschen Phytophagen aus der Klasse der Insekten,' von J. H. Kaltenbach; by the Author. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part xx. Geometrites; by the Author, Francis Walker, Esq., F.L.S., &c. 'Insecta Saundersiana, or Characters of Undescribed Insects in the Collection of William Wilson Saunders, Esq., F.R.S., &c.;' 'Coleoptera Curculionides,' Part ii., by Henri Jekel; by W. W. Saunders, Esq.

Exhibitions.

The President exhibited a living specimen of Homæusa acuminata, found by Mr. Scott in a nest of Formica fuliginosa, at Mickleham, and living examples of Claviger testaceus from the same locality.

Mr. Stevens exhibited a large collection of Coleoptera, made by Mr. H. Squire in the neighbourhood of Rio.

Mr. Janson exhibited some Coleoptera and Lepidoptera sent from Perthshire by Mr. Turner.

Mr. Scott exhibited Bolitobius inclinans, Mycetoporus lucidus and Elachista gangabella, and made the following observations respecting them:—

Bolitobius inclinans, Grav. A single example taken at Coombe Wood. Authors, so far as I am aware, have not observed, or if so not described, the remarkable development of the basal joint of the intermediate tarsi.

Mycetoporus lucidus, Erichs. Only three or four individuals of this species are known as having been taken in England previously. One specimen also taken at Coombe Wood.

Elachista gangabella, Zeller. The type form of this species has a white fascia on the anterior wings, as in E. zonariella and others of the group. The specimen exhibited, however, is entirely black. In certain lights there are very faint indications of the fascia. Bred by me last year from larvæ received from Mr. Stainton. It seems to be quite a south country species, and very local.

Mr. W. W. Saunders exhibited a small folding box, manufactured by Mr. Harris, of Oak Lane, City, for the purpose of transmitting small articles by post; from its lightness and strength he considered it would prove useful for entomological purposes.

Mr. Saunders also exhibited some small galls growing in close clusters, found under the ground on the roots of common hazel. He had not yet succeeded in rearing the insect which caused them, but considered it must prove a distinct species from the Cynips Quercus-radicis, the galls produced by which are found on the oak, generally on the surface or immediately above ground.

Mr. Saunders also exhibited an apparently new species of Harpalus, taken in Ireland by Mr. Bouchard; and illustrations of the economy of a beetle, apparently of the genus Urodon, from the Cape of Good Hope, which, in the larva state, inhabits one of the cells in the seed-vessel of a Mesembryanthemum, forcing the remaining cells, which become abortive, into a very small space.

Mr. Walker observed that the galls exhibited by Mr. Saunders were probably similar to one which Mr. Bouchard had lately found at the root of an oak tree. This gall was in the possession of Mr. Smith, who has reared numerous Cynipidæ from it, and also specimens of a Pteromalus, which much resembles P. Puparum, the butterfly-chrysalis parasite.

Mr. H. Cooke exhibited a hybrid moth which had been obtained in the following manner. He had bred a considerable number of Ephyra trilinearia and E. orbicularia, and had repeatedly endeavoured to pair the opposite sexes of these species, but only succeeded in one instance in doing so, the insects being a male E. orbicularia and female E. trilinearia. The female deposited eight eggs, all of which hatched, and the larvæ in due course were full-grown, at which time they presented great dissimilarity in appearance, two or three exactly resembling the larvæ of E. trilinearia, while others were precisely like those of E. orbicularia, the remainder differing much from those of either parent. Although all of them seemed to enter the pupa state in the most satisfactory manner, yet only the one moth exhibited, and that somewhat crippled in the posterior wings, was produced. This insect bore very little resemblance to either species, the colour and markings approaching nearer to E. poraria, the central fascia common to all the wings being broad and well defined.

Mr. Bond exhibited a specimen of Smerinthus ocellatus, having one side of the

abdomen pure white, the markings in all other respects being as usual. The insect was taken at Freshwater.

Mr. Rye exhibited a specimen of Euryporus picipes, taken at Holme Bush. Also both sexes of Ptinus germanus, from Purfleet; and a fine series of Badister peltatus, taken by himself near Boston.

Mr. Saunders read the following extracts from Froebel's 'Central America,' pp. 433 and 537:—

Poisonous Caterpillars.

"Early the next morning we arrived at San Antonio. Here I learned what had befallen, during the three months of my absence, the small caravan with which I had started from Chihaohoa. They had encamped in the prairie, a few miles from San Antonio. Sickness had broken out among the mules, carrying off nineteen of the best animals, and afterwards more died on the road. Several had been bitten by rattle-snakes, and saved with the greatest difficulty. The same thing happened to one of our drivers, but a remarkable accident befel the waggon-master; he had crushed on his hand a little hairy caterpillar which was crawling on it, and in a few minutes the most alarming symptoms appeared. A shiver ran from the hand through his whole frame, and especially down his back. His abdomen swelled, his tongue was heavy, his consciousness became dimmed, and for a week the man was in imminent danger. I afterwards saw the caterpillar in a collection of insects at San Antonio, where the patient recognised it. If he was right it is a little worm covered with long yellowish hairs, about a quarter of an inch long; it resembles a caterpillar, but whether it is one I cannot say. I afterwards heard of other examples of the extraordinary effects caused by this creature. In a garden at Indianola one of them dropped from a tree on to a child's arm, who immediately screamed with pain; the arm swelled, a violent fever came on, and the child's life was in great danger for several days."—p. 433.

Mineralogical Ants.

"Before continuing the account of our journey I must offer a remark connected with an observation I made in the desert. When traversing certain parts of the North-American Steppes and Deserts I have frequently observed ant-hills formed exclusively of small stones of the same mineral species, as, for instance, small grains of quartz. In one part of the Colorado Desert the hills of these mineralogical ants consisted of heaps of small shining fragments of crystallized feldspar, chosen by these little animals from the various components of the coarse sand of these parts. The last time I was at El Paro a North-American driver came to me and inquired the value of a small bag of garnets he possessed. On my asking in what place they had been found I heard that these stones — imperfect crystals of red transparent garnets — were the material of which the ants build their hills in the country of the Navago Indians, in New Mexico, and that he knew a place where any quantity of them might be collected. These remarks may perhaps not be uninteresting to the question relating to the gold-seeking ants of Herodotus."— p. 537.

Mr. Saunders also read descriptions of some new species of the genus Erateina; and exhibited the insects to the meeting.

Part 5 of the current volume of the Society's 'Transactions' was on the table.— *E. S.*

Notices of New Books.

'*The Canadian Naturalist and Geologist.*' Vol. v., Nos. 1 and 2. Montreal: Dawson, Great St. James Street. London: Sampson Low, Son and Co.

The commencement of a fifth volume of 'The Canadian Naturalist' is a fact to be hailed with satisfaction, and we may state that it fully maintains its interesting character. Mr. D'Urban contributes "Observations on the Natural History of the Valley of the River Rouge;" Dr. Dawson a paper "On the Tubicolous Marine Worms of the Gulf of St. Lawrence;" Mr. Kemp "A Classified List of Marine Algæ from the Lower St. Lawrence;" Mr. Billings describes a new Palæozoic Starfish of the genus Palæaster from Nova Scotia; "An Abridged Sketch of the Life of Mr. David Douglas, the Botanist;" a paper "On the Silurian and Devonian Rocks of Nova Scotia, by Dr. Dawson;" "Descriptions of New Species of Fossils from the Silurian Rocks of Nova Scotia," by Mr. Hall; "A Review of Darwin's great work 'On the Origin of Species by Natural Selection;'" and a number of miscellaneous papers extracted with much judgment from other journals. I have gladly accepted the offer to exchange the 'Zoologist' for the 'Canadian Naturalist;' I hope other editors of English or European journals will follow the example, and will from time to time give a summary of the contents of the latter. Nothing tends more effectually and beneficially to advertise a Natural-History periodical than the plan of giving a list of its contents, unaccompanied by any disparaging observations. Praise is not required, nor will it induce many purchasers, but a careful abstaining from every remark that can be construed into an exhibition of ill-will or jealousy on the part of the editor is absolutely essential when dealing with the labours of a brother journalist.

'*Animal Physiology.*' By William Carpenter, M.D., F.R.S., G.,S. L.S. New Edition. Thoroughly revised and partially rewritten. London: H. G. Bohn, York Street, Covent Garden. 1859. Foolscap 8vo., 604 pages letterpress, and numerous woodcuts.

This book is so well known that it is useless to say anything of this particular edition.

A Revision of the Synonymy of the British Species of the Genus Bombus of Latreille. By FREDERICK SMITH, Esq., Zoological Department of the British Museum.

IN the second volume of the 'Zoologist' I published my first revision of the genus Bombus; in the fourth I described, as a new species, the B. subterraneus, and on turning back to the remarks which I at that time added it will be seen that I was conscious of the difficulties which attended a discrimination of the species, and expressed a conviction that hereafter it would be found that I had committed many errors.

In 1855 my monograph on the Bees of Great Britain was published, and the synonymy again underwent a revision; many corrections were undoubtedly made, but several errors were again endorsed.

It may at first sight appear somewhat remarkable that a third revision should be found necessary, but this idea will not occur to those who have studied the Apidæ. I by no means flatter myself that the revision which I now put forth is perfect, but I think it will prove to be a close approach to so desirable an end. It is doubtless a work of considerable labour to work out the species of even a small group of insects so as to bring the nomenclature into satisfactory accordance with that employed by continental authors, and when this desirable end is accomplished how frequently does a single lesson of out-door Entomology upset some of our apparently most felicitous conclusions!

Were I to delay the publication of the nomenclature until I have satisfied myself of its being so perfect that nothing, apparently, could subsequently disturb any portion of my fancied work of perfection, it is probable that this paper would never see the light; but having amassed probably the largest amount of material that has ever been brought together for the purpose of investigation, and having with much care and to the best of my ability thoroughly gone over it, I deem it best to place the results in an available position.

In order that I might come to my task prepared with the best possible materials for the purpose, I entered into correspondence with Hymenopterists in Denmark, Sweden, France and Germany, and having supplied them with examples of the British species, and also received from them the species of their respective localities, I have been in a position to rectify many errors which, without possessing specimens, I could never have accomplished. The short general descriptions of both Linneus and Fabricius are not sufficient for such

a purpose; and as they seldom give any clew to the size of their insects, this circumstance alone, in many instances, renders discrimination impossible.

It is a well-known fact that humble bees, being all densely clothed with hair, are subject to extremes of variation, through bleaching by exposure to the sun, &c. This, however, is not the only difficulty: two of our most abundant species of brown bees, B. Muscorum and B. senilis are frequently so closely alike that none but a practised eye can detect their differences, and yet the former of these runs into innumerable varieties, so much so as to induce Kirby to create eight species out of them; the latter, B. senilis, only differs in being more or less pale. On the other hand some species seldom, if ever, vary; in B. Hortorum, for instance, a species found in all parts of Europe, specimens of which I have seen from Lapland, Finland, Denmark and the South of France, I cannot detect any sensible difference; others, from the regions of Arctic America, exactly correspond with examples taken in the vicinity of the metropolis.

Fabricius has described, in the 'Systema Piezatorum,' thirty-three species of European Bombi, only nineteen of which are, in my opinion, entitled to that rank; the remaining fourteen being either varieties, males or workers of the former. Many of these it would be impossible to assign to the species to which they really belong without an examination of the typical specimens of the insects described; fortunately this has been accomplished, in several instances, by Dr. Nylander and M. Drewsen, of Copenhagen. To both these eminent Hymenopterists I am greatly indebted for information, which has, in a considerable degree, reduced the difficulties which stood in my way.

Having found an examination and comparison of the male generative organs an unfailing guide in the determination of the species in the family Vespidæ, I determined to test its value in the discrimination of the species of the genus Bombus, and the results have proved most satisfactory; in general, the differences of form are most marked and decisive, and it is only in one or two cases that the differences are slight; but even then I consider them satisfactory: the species between which I have found the slightest differences are B. terrestris and B. Lucorum. There is not a single species which has not undergone such an examination; and in order to test the constancy of form in the male organs I have, in the cases of B. Muscorum, B. lapidarius and B. Hortorum, examined from thirty to forty of each species, and can therefore confidently attest the value of such investigations and comparisons. The results contained in this paper cannot, I am aware,

prove interesting to the readers of the 'Zoologist' generally; but whenever the time may arrive in which the Aculeate Hymenoptera receive their due share of entomological research, my labours on the genus Bombus will be found, I trust, to have been not altogether prosecuted in vain.

Since the commencement of this paper my esteemed correspondent, Mr. Charles Drewsen, has forwarded me his collection of Bombi from Copenhagen; in my communications I had mentioned my intended revision: for this liberal and voluntary assistance, not my thanks alone, but that of every Hymenopterist in the country is due. I am now enabled to speak and to make corrections with a confidence I could not otherwise have assumed.

I have not had occasion to make any alteration in the synonymy of the genus Apathus, that which I gave in the 'Monograph on the Bees of Great Britain' being, as I believe, correct: M. Drewsen thinks there is a fifth species, the male being the A. Francisanus of Kirby, and the female what I consider nothing more than a variety of Apathus campestris: this point will perhaps be more thoroughly investigated by some future Hymenopterists.

1. B. Muscorum, *Fabr. Syst. Piez.* 349, 32. *Dahlb. Bomb. Scand.* 46, 27. *Drews. & Schiödte, Bomb. Kröy. Tidsskr.* ii. 108, 2. *Smith, Bees Great Brit.* 212, 1. *Nyl. Ap. Bor.* 228, 4.

Apis Muscorum, *Linn. Faun. Suec.* No. 1714.

Bombus Mniorum, *Fabr. Syst. Piez.* 350, 40 (var. ☿). *Drews. & Schiödte*, t. 2, f. *a*, *b*.

Bombus senilis, *Fabr. Syst. Piez.* 352, 50, ☿.

Bombus pygmæus, *Fabr. Syst. Piez.* 353, 54, ☿.

Apis floralis, *Kirby, Mon. Ap. Angl.* ii. 321, 76, ♀. Apis Beckwithella, *Kirby*, 323, 78, ♀. Apis Agrorum, *Kirby*, 326, 81, ♀.

Apis Sowerbyana, *Kirby*, 322, 77, ♂. Apis Curtisella, *Kirby*, 324, 79, ♂. (*var*).

Apis Francillonella, *Kirby*, 319, 75, ☿. Apis Forsterella, *Kirby*, 325, 80, ☿.

The B. Mniorum is a remarkable variety, which, I am informed by M. Drewsen, is not uncommon in Denmark: this form is nearly approaching to blackness in all the sexes; in England I have only seen an approach to it in the workers. The B. senilis of Fabricius, I am informed by Dr. Nylander, who has examined the typical specimen in the Museum at Kiel, is a small variety of this species; the synonym, B. pygmæus, is added on the same authority. I have

obtained from different continental localities the true B. Agrorum; it is very distinct from the variety A. Agrorum of Kirby, and is a species not yet I believe discovered in this country. That this is the true Apis Muscorum of Linneus is proved by an examination of the typical specimen in the Linnean Cabinet in the Museum of the Linnean Society. I have also obtained specimens from Sweden and Denmark which are identical with the Linnean insect. In M. Drewsen's collection is a fine series of the variety B. Mniorum: every shade of variety exists between our darkest specimens of the female, and one in which the pubescence on the thorax and abdomen above is black, having a few pale hairs intermixed at the base and apex of the abdomen. The other sexes vary in a similar manner; the intermediate varieties strongly resemble examples of B. Sylvarum.

2. B. senilis, *Smith, Zool.* ii. 544, 1 (nec Fabr.); *Bees Great Brit.* 214, 2.

Bombus cognatus, *Steph. Brit. Ent. Supp.* vii. 17, t. 43, f. 3, ♀. (immature).

Apis Muscorum, *Kirby*, ii. 317, 74. *Don. Brit. Ins.* xi. 70, t. 382, f. 2.

Bombus Muscorum, *Westw. Nat. Libr.* xxxviii, 253, t. 16, f. 3, ♀.

This species is readily distinguished from B. Muscorum by the rich fulvous pubescence on the thorax above, and by the almost uniform paler colour of the pubescence on the abdomen; the corbicula are also pale; in B. Muscorum they are black or nearly so. I formerly supposed, relying on the description in the 'Entomologia Systematica,' that the B. senilis was a faded specimen of the worker of this species, but Dr. Nylander informed me that B. senilis is a pale worker of B. Muscorum; I therefore retain the name, having twice described it as B. senilis.

I have stated in my preliminary remarks that this species seldom or never varies; I may here add that in a series of Danish specimens I observed no variation or even the slightest difference to British examples.

3. B. Smithianus, *White, Proc. Linn. Soc.* 1851. *Smith, Mon. Bees. Great Brit.* 215, 3.

Through the kindness of M. Drewsen I have had an opportunity of examining specimens of the B. arcticus of Dahlbom, and I find it a distinct species from B. Smithianus. I may also add that I can detect no difference between it and the B. Agrorum of Europe. This species

was discovered by my fellow assistant at the British Museum, Mr. Adam White, in Shetland, in 1851.

4. B. fragrans, *Illig. Mag.* v. 146, 10. *Dahlb. Bomb. Scand.* 46. *St. Farg. Hym.* i. 464. *Drews. & Schiödte, Kröy. Tidsskr.* xi. 171. *Smith, Bees Great Brit.* 216. *Nyl. Ap. Bor.* 229, ♂, ♀, ☿.

Apis fragrans, *Kirby*, ii. 329, 83, ♂.

There is not the slightest difference between British and Danish specimens of this species. It does not appear to vary in colouring.

5. B. Sylvarum, *Illig. Mag.* v. 163, 9. *Fabr. Syst. Piez.* 348. *Dahlb. Bomb. Scand.* 44. *St. Farg.* i. 463. *Drews. & Schiödte*, 109. *Smith, Mon. Bees Great Brit.* 217. *Nyl. Ap. Bor.* 236.

Apis Sylvarum, *Linn. Faun. Suec.* 425, 1713.

The colouring of this species appears to undergo no change in the different localities where it is found; it occurs in France, Germany, Italy, Denmark, Sweden, Finland and Lapland.

6. B. lapponicus, *Fabr. Syst. Piez.* 345. *Dahlb. Bomb. Scand.* 41. *Zett. Ins. Lapp.* 474. *St. Farg. Hym.* i. 459. *Smith, Mon. Bees Great Brit.* 218. *Nyl. Ap. Bor.* 235.

B. Regelationis, *Newm. Ent. Mag.* ii. 327 (nec Panz).

Examples of this species from Lapland, which I have received from Dr. Nylander, are much more highly coloured than British specimens. The abdomen is of an intense fulvous-red, the apex of the abdomen, as well as the scutellum and collar, being bright yellow. Mr. Newman first discovered this species in Wales, on the Black Mountain, Llantony Abbey, Brecknockshire. It has since been taken plentifully in Perthshire, on the Grampians.

7. B. Derhamellus, *Illig. Mag.* v. 169, 29, ♀, ♂. *Dahlb. Bomb. Scand.* 33, 4. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 115, 9. *Smith, Mon. Bees Great Brit.* 219, 7, ♂, ♀. *Nyl. Ap. Bor.* 238, 26.

Apis Derhamellus, *Kirby, Mon. Ap. Angl.* ii. 363, 105, ♂.

Apis Raiellus, *Kirby, Mon. Ap. Angl.* 367, 107, ♀.

The males of this species are subject to great variation in the colouring of the pubescence; it is sometimes black, with the apex of the abdomen red; or black, with somewhat obscure gray pubescence on the thorax in front and behind, as well as at the base of the abdo-

men, the apex being red. In some examples little remains of the black pubescence except an obscure band between the wings, the abdomen being pale fulvous at the base, and gradually becoming brighter in colour to the red apex ; many intermediate shades occur.

8. B. Pratorum, *Illig. Mag.* v. 168, 27, ☿. *Dahlb. Bomb. Scand.* 36, 9. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 111, 7, ♀, ♂, ☿. *Smith, Mon. Bees Great Brit.* 220, 8. *Nyl. Ap. Bor.* 237, 23.

Apis Pratorum, *Linn. Faun. Suec.* 1711. ☿. *Kirby, Mon. Ap. Angl.* ii. 356, 99.

Apis subinterrupta, *Kirby, Mon. Ap. Angl.* ii. 356, 99, ♀.

Apis Burrellana, *Kirby, Mon. Ap. Angl.* 358, 101, ♂.

Bombus subinterruptus, *Illig. Mag.* v. 167, 20, ♀. *Dahlb. Bomb. Scand.* 43, 22. *St. Farg. Hym.* i. 461, 5. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 111, 7.

Bombus Burrellanus, *Dahlb. Bomb. Scand.* 43, 22.

Bombus Ephippium, *Dahlb. Bomb. Scand.* 37, 10, ♀. *Zett. Ins. Lapp.* 437, 6.

Bombus lullianus, *Nyl. Ap. Bor.* 236, 21, ♂.

The typical specimen of the Apis Pratorum of Linneus is in the Linnean Cabinet: the nests of the species being not at all difficult to obtain renders the propriety of uniting the sexes, which have at different times been described as distinct species, a matter of certainty. The Apathus Barbutellus is parasitic on this species; Mr. Walcott and Mr. Grant have both reared that parasite from its nest. The B. Ephippium of Dahlbom is a variety of the female in which the yellow colouring on the scutellum and abdomen is obsolete.

9. B. Cullumanus, *Smith, Zool.* ii. 548, 11, ♂ ; *Mon. Bees Great Brit.* 227 (var. B. soroensis, ♂).

Apis Cullumanus, *Kirby, Mon. Ap. Angl.* ii. 359, 102, ♂.

Apis Donovanella, *Kirby. Mon. Ap. Angl.* ii. 357, 100, t. 18, f. 6, ♀.

Bombus Donovanella, *Westw. Nat. Libr.* xxxviii. 255, t. 17, f. 1, ♀.

Although both the male and female of this species closely resemble those of B. Pratorum, I know the male to be certainly distinct; a comparison of the organs of generation decides this beyond a doubt. I do not feel equally certain that the A. Donovanella is the true female, but I possess examples of that bee, taken at the same time and place with the male. I am also borne out in this, to some extent, by examples sent to me for examination by Mr. Walcott; of three sent for this purpose, one was taken by Mr. Dale some years ago, a second

taken in the New Forest by Mr. Lighton, and a third captured near Bristol; my own specimens are from Southend. I have previously, as well as Dr. Nylander and others, considered the sexes as varieties of B. Pratorum; the male I now know is not, and I have little doubt respecting the distinctness of the female. When Schiödte was in this country he pointed out in my collection the B. Cullumanus as a variety of the male of B. soroensis, and as such I have several times received it from Denmark: a comparison of the organs of generation shows this to be quite erroneous. I do not know the workers of this species, but as the insect is found on the Downs at Brighton and Lewes, and also at Bristol I hope ere long its nests will be found, and the correctness of my present conclusions proved. The female, on placing several at the side of that of B. Pratorum, is seen to be, as Kirby observes, shorter and wider; the black band on the abdomen is also narrower, the yellow pubescence covers the two basal segments; in fact it has a kind of specific identity of colouring with B. Cullumanus. In M. Drewsen's collection, the male stands as a distinct species, the female and worker not being known; it has, however, no name attached.

10. B. nivalis, Apis alpina, *Fabr.* (*Otho*), *Faun. Græn.* 199, 155 (nec Linn).

Bombus nivalis, *Dahlb. Bomb. Scand.* 40, 16, ♀. *Zett. Ins. Lapp.* 474, 7. *Nyl. Ap. Bor. Revis.* 262, 6. *Smith, Mon. Bees Great Brit.* 222, 9.

Bombus balteatus, *Dahlb. Bomb. Scand.* 36, 8.

Bombus tricolor, *Dahlb. Bomb. Scand.* 40, 17. *Zett. Ins. Lapp.* 474, 9.

Professor Bohemann told me that the female of this species varies in having the apex of the abdomen sometimes fulvous and at other times yellow. All the specimens which I have seen came from Shetland, and have the anus fulvous: I have not seen any specimens from other localities.

11. B. Skrimshiranus, *Illig. Mag.* v. 166, 15. *Dahlb. Bomb. Scand.* 39, 13. *Drews. & Schiödte, Kröy Tidsskr.* ii. 118, 12. *Smith, Zool.* ii. 547; *Mon. Bees Great Brit.* 222, 10. *Nyl. Ap. Bor.* 232, 12.

Apis Skrimshirana, *Kirby, Mon. Ap. Angl.* ii. 342, 92, ♀.

Apis Jonella, *Kirby, Mon. Ap. Angl.* ii. 338, 90, ♂ ?

Bombus Lucorum, *Dahlb. Bomb. Scand.* 42, 20, ♂.

This species is widely distributed, being found in Great Britain,

Denmark, Sweden, Finland and Lapland; at Loch Rannoch it is not uncommon. It does not appear to vary much in colouring. It is rare in the vicinity of the metropolis; I once captured a female on the high ground beyond Coombe Wood, Surrey.

12. B. soroensis, *Illig. Mag.* v. 167, 22. *Fabr. Syst. Piez.* 345, 10, ♀. *Dahlb. Bomb. Scand.* 43, 22. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 112, 8, t. 2, f. e ♂, f. ♀. *Nyl. Ap. Bor.* 239, 28.

Apis soroensis, *Fabr. Ent. Syst.* ii. 318, 12. *Panz. Faun. Germ.* 7, 11, ♀.

Apis neutra, *Panz. Faun. Germ.* 83, 18; *Krit. Revis.* ii. 259, ☿.

Bombus neutra, *Fabr. Syst. Piez.* 347, 24. *St. Farg. Hym.* i. 469, 15.

Bremus Sylvarum, *Panz. Faun. Germ.* 85, 19 (nec Linn., Kirby).

Bombus collinus, *Smith, Zool.* ii. 548, 17, ♂; *Mon. Bees Great Brit.* 223, 11.

I believe the above synonymy to be the most correct which has been given. I have proved to my perfect satisfaction that neither B. Cullumanus or B. Burrellanus are varieties of the male of this species; a comparison of the generative organs decides that point. I gave B. Cullumanus as a variety in my 'Monograph' on the authority of Schiödte and Nylander. Since the publication of my work I have had an opportunity of examining nearly a hundred examples of the male, from the collection of the late Mr. Heysham. These vary considerably in colouring; in some the apex of the abdomen is rosy red, in others it is white, separated from the black band by a narrow line of fulvous; in rare instances the abdomen is nearly entirely black, having at the tip only a few cinereous hairs. M. Drewsen informs me that he has them with that part quite black. It is strange that although Mr. Heysham captured the males in such abundance his collection did not contain a single female. I possess numerous examples of all the sexes, from Denmark, which agree exactly with British examples. This bee constructs its nest underground. I possess a single example of the female, which I believe was taken in Yorkshire; Mr. Walcott has the same sex from the Brighton and Bristol Downs. In the collection of M. Drewsen is a beautiful series of the varieties of all the sexes; the female is sometimes black, with the apex of the abdomen rosy red; the males and workers run also into this extreme variety. This variety of the female would of course resemble B. Derhamellus, but there is less red at the tip of the abdomen and it is of a paler tint, and the corbicula on the posterior tibiæ is black.

13. B. terrestris, *Smith, Zool.* ii. 547, 10; *Mon. Bees Great Brit.* 224, 12. *Nyl. Revis. Ap. Bor.* 262, 7 (nec var. B. Lucorum). *Westw. Nat. Libr.* xxxviii. 243, t. 14, ♂, ♀, ☿.

Apis terrestris, *Linn. Faun. Suec.* 424, No. 1709, ♀? *Cab. Mus. Lin. Soc. Don. Brit. Ins.* iii. 41, t. 88, f. 1. *Kirby, Mon. Ap. Angl.* (var. γ and ε, ♀); Specimen in the Museum of the Entomological Society.

I have very great doubt of this being the Linnean A. terrestris; in the first place, both Schiödte and Dahlbom, to whom I showed specimens of the insect, told me it was new to them, and not found, to their knowledge, in Sweden or Denmark. The specimen in the Linnean Cabinet I think must have had the label attached to it in mistake; there is a female of B. Lucorum in the same drawer, and that, I believe, is the specimen to which it rightly belongs; I have no doubt that the female of B. Lucorum is the true A. terrestris of Linneus. Dr. Nylander thinks B. Lucorum a variety of B. terrestris: this I feel assured is not the case; I have taken many nests of both insects, and never found them intermingled; and I have taken B. Lucorum *in coitu* several times, but never with the male of "terrestris." That the species do sometimes mix in community appears certain, as Mr. Trimmer communicated the fact to Mr. Kirby, who united the females of Lucorum and terrestris, describing his A. Lucorum as a male of which he did not know the female: this has been the practice of most naturalists since the time of Linneus.

14. B. Lucorum, *Illig. Mag.* v. 166, 5. *Fabr. Syst. Piez.* 350, 37, ♂. *Smith, Zool.* ii. 546, 6, ♂, ♀, ☿; *Mon. Bees Great Brit.* 225, 13. *Nyl. Revis. Ap. Bor.* 262 (var. terrestris).

Apis Lucorum, *Linn. Faun. Suec.* 427, No. 1716, ♂. *Cab. Mus. Linn. Soc. Fabr. Ent. Syst.* ii. 322, 35. *Kirby, Mon. Ap. Angl.* ii. 336, 89.

Apis terrestris, *Linn. Faun. Suec.* 424, No. 1709, ♀. *Christ. Hym.* 127, t. 7, f. 2, ♀.

Apis Cæspitum, *Panz. Faun. Germ.* 31, 19, ♂.

Bombus terrestris, *Latr. Hist. Nat. Ins.* xiv. 64, 1, ♀. *Fabr. Syst. Piez.* 343, 4. *Dahlb. Bomb. Scand.* 34, 5, f. 5. *Zett. Ins. Lapp.* 473, 4. *St. Farg. Hym.* i. 467, 13. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 118, 12. *Nyl. Ap. Bor.* 233, 13.

Bombus sporadicus, *Nyl. Ap. Bor.* 232, 15.

This species is widely distributed, being found in Denmark, Sweden, Finland, Lapland and Siberia; I have also seen a form of it from

Greece and Sicily, which has the corbicula pale fulvous. Although the female does not appear to be subject to vary, the male does so very considerably; from the normal colouring of the species — black, with a yellow band on the collar and base of the abdomen, with its tip white — it varies to a form nearly entirely yellow, with a faint dark band between the wings, and one or two on the abdomen.

15. B. lapidarius, *Latr. Hist. Nat. Ins.* xiv. 64, 2, ♀. *Illig. Mag.* v. 169, 30. *Fabr. Syst. Piez.* 347, 25. *Dahlb. Bomb. Scand.* 30, 1. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 116, 11. *Westw. Nat. Libr.* xxxviii, 252, t. 16, f. 1, ♂, 2, ♀. *Smith, Mon. Bees. Great Brit.* 228, 15, ♂, ♀, ☿. *Nyl. Ap. Bor.* 238, 25.

Apis lapidarius, *Linn. Faun. Suec.* 424, No. 1712. *Fabr. Ent. Syst.* ii. 329, 25. *Don. Engl. Ins.* iii. 97, t. 108, f. 1, ♀, t. 58, f. 2, ☿. *Kirby, Mon. Ap. Angl.* ii. 363, 106.

Bremus Truncorum, *Panz. Faun. Germ.* 85, 21, ♂.

Bombus Lefebvrei, *St. Farg. Hym.* i. 461, 4, ♀ (var).

This species is found throughout Europe; it is not subject to vary. A rare variety having a yellow collar does sometimes occur; this is the B. Lefebvrei of St. Fargeau. I have only seen a single example captured in this country; it was taken at Sandwich, in Kent, and was in the collection of the late Mr. Wing.

16. B. Hortorum, *Latr. Hist. Nat. Ins.* xiv, 65, 5. *Illig. Mag.* v. 166, 14. *Dahlb. Bomb. Scand.* 38, 12. *St. Farg. Hym.* i. 466, 12. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 120, 16. *Smith, Mon. Bees Great Brit.* 230, 16. *Nyl. Ap. Bor.* 231, 11.

Apis Hortorum, *Linn. Faun. Suec.* 424, No. 1710. *Kirby, Mon. Ap. Angl.* ii. 339, 91.

Bombus autumnalis, *Fabr. Syst. Piez.* 352, 47, ♂.

I have never met with any varieties of this species. In general coloration it corresponds with the B. ruderatus of Fabricius, but it is a smaller insect. Fabricius gives as the habitats of B. ruderatus Denmark and Madeira; I have obtained the sexes of this insect from both localities, and, by a comparison of the male organs, have satisfied myself of its being distinct from B. Hortorum. In my opinion B. ruderatus is only a highly-coloured form of B. subterraneus. M. Drewsen has sent to me varieties, as he considers, of this species, but I do not agree with him in that opinion; I believe them to be females and workers of B. Latreillellus: these are destitute of yellow

colouring, with the tip of the abdomen white; in some, the scutellum has a faint tinge of yellow.

17. B. Latreillellus, *Illig. Mag.* v. 164, 11, ♂. *Dahlb. Bomb. Scand.* 39, 14. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 119, 14. *Smith, Mon. Bees Great Brit.* 231, 17. *Nyl. Ap. Bor.* 234, 18; *Revis. Ap. Bor.* 261.

Apis Latreillellus, *Kirby, Mon. Ap. Angl.* ii. 330, 84, ♂.

Apis Tunstallana, *Kirby, Mon. Ap. Angl.* ii. 346, 94, ♀.

Bombus Tunstallanus, *Illig. Mag.* v. 166, 16. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 119, 14, ♀. *Nyl. Revis. Ap. Bor.* 261, 4.

The synonymy of this species is, I think, undoubtedly correct. In addition to the discovery of several nests, whence I obtained the sexes, I captured three pairs *in coitu*. The species is extremely abundant at Southend and at Walmer, in Kent. I have received the species from Denmark as a variety of B. Hortorum, that is, female and worker, the male being correctly named B. Latreillellus.

18. B. subterraneus, *Illig. Mag.* v. 169, 32. *Fabr. Syst. Piez.* 350, 39, ♀. *Dahlb. Bomb. Scand.* 38, 11. *Drews. & Schiödte, Kröy. Tidsskr.* ii. 116, 11. *Smith, Mon. Bees Great Brit.* 232, 18. *Nyl. Ap. Bor.* 239, 27.

Apis subterranea, *Linn. Faun. Suec.* 425, No. 1718, and type in *Cab. Linn. Soc.* ♀. *Fabr. Ent. Syst.* ii. 322, 37.

Apis Harrisellus, *Kirby, Mon. Ap. Angl.* ii. 373, 110, t. 18, f. 7, ♀, 8, ♂.

Bombus Harrisellus, *Westw. Nat. Libr.* xxxviii. 256, t. 18, f. 1, ♂. *Smith, Zool.* ii. 550, 16.

Bombus flavonigrescens, *Smith, Zool.* iv. 1556.

Apis ruderata, *Fabr. Ent. Syst.* ii. 317, 10, ♀.

Bombus ruderatus, *Fabr. Syst. Piez.* 344, 6.

This species is extremely variable in colouring; the most highly coloured, B. ruderatus, has the thorax in front, the scutellum and the base of the abdomen yellow; every shade of difference occurs between this form and one entirely black. The variety with the apex of the abdomen whitish and otherwise end entirely black I formerly considered the B. soroensis of Fabricius. It will probably be questioned whether I am justified in considering the B. Harrisellus a variety; indeed Nylander gives it with doubt in the revision of his Apis borealis; one reason for my doing so is based upon the fact of my being unable to distinguish any difference in the form of the generative organs

of the black and highly coloured males; and in the second place, having in my possession a male and female, taken *in coitu*, and presented to me by Mr. Baly. The latter fact it may be said is not conclusive evidence, since I myself on one occasion captured the male of B. lapidarius in connexion with the female of B. terrestris: this is, however, the only instance which I have observed during twenty-five years of assiduous collecting, therefore such occurrences must be rare. Should the discovery of a colony, in which all the individuals are black, be made, a doubt of the propriety of uniting these varieties might be entertained; but even then, having in every instance, in undoubtedly distinct species, found a most distinct difference in the form of the male organs, I should be more inclined to consider the black colony, as nothing more than an entire brood of the extreme variety of the species. In M. Drewsen's collection the B. Harrisellus is sent as a variety of B. subterraneus; all the sexes stand there without a doubt attached to them.

FREDERICK SMITH.

Rough Notes on Canadian Hymenoptera.

By W. S. M. D'URBAN, Esq.

I MUST plead want of leisure for having bestowed only slight attention on the Hymenoptera during the three years of my residence in Canada, but Mr. Frederick Smith, of the British Museum, having obligingly determined some of the few species I collected, I have assembled together the notes relating to them, which I have found dispersed through my journals of observations on Natural History, and venture to offer them to the 'Zoologist' as a small contribution to Canadian Entomology, which has, unfortunately, been much neglected. Besides those enumerated below, I brought home a few new and undescribed species, which I have presented to the British Museum.

Family TENTHREDINIDÆ.

Cimbex femorata, Linn. (*variabilis*, Klug). I took both sexes of of this fine species north of the Ottawa, in the townships of Montcalm and Arundel, in July, 1858, and I have received specimens from the Falls of Niagara. At the end of August, 1858, in a small lake near Hamilton's Farm, about fifty miles up the River Rouge, a tributary of the Ottawa, into which it discharges itself about nine miles above

the town of Grenville, I observed that the water was full of a peculiar, soft, green substance, in star-shaped pellets, which I found to be the excrement of saw-fly larvæ, feeding in great numbers on the leaves of the alder bushes and yellow birch trees overhanging the lake. They were gray on the back, yellow underneath, and sprinkled over with black spots; legs and claws black: one specimen larger than the rest was pale green; head white, with two black spots upon it, a row of black spots down each side, and numerous transverse rows of roughish white spots. As this specimen spun up in a few days it was probably the same as the others, but in a more advanced stage. I did not succeed in rearing it, as it shrivelled up in its cocoon, from the dryness of the house, during the following winter. From its size and colour it may have been the larva of this Cimbex.

C. decim-maculata, Leach. One specimen received from L'Oriqual on the Ottawa. Mr. Gosse reared it from larvæ found feeding on willows in August, in the Eastern townships.

Nematus ———. In 1857 I bred a small species of Nematus from a woody gall which is extremely abundant and easily seen in autumn, after the leaves have fallen, on the twigs of a species of willow growing plentifully in swamps, near Montreal. The dead shoot at the tip of the gall forms a long, curved tube, through which the perfect insect effects its escape in May, each gall producing a single specimen only. I have also reared from these galls numbers of a minute Chalcidite (Lampronotus), which I imagine to be a parasite of the Nematus. A Dipterous fly inhabits a very similar gall on the same willow bushes.

Sirex flavicornis, Fabr. I have had specimens of this Sirex brought to me which had been found in the cellar of a store in Montreal, having most probably issued from the fire-wood kept there. I also took it in the woods of the counties of Argenteuil and Ottawa, in July and August, 1858.

S. albicornis, Fabr. Common at Sorel and Montreal, and very numerous in the woods to the north of the Ottawa, in the county of Argenteuil, from the beginning of July to September. It occurs also on the Southern shores of the Gulf of St. Lawrence. The females vary greatly in size, and the males of this, as well as of the other Sireces, are very rarely seen.

S. dimidiatus, West. One specimen taken about fifty miles up the River Rouge, August 16, 1858.

S. cyaneus, Fabr. Two specimens were taken between the sheets of a bed, in a house near Montreal, in August. They were supposed

to have come out of the wood-work of the bedstead, but no holes could be discovered in it.

Tremex Columba, Linn. Every one who has ever visited the neighbourhood of the beautiful city of Montreal in the summer season must have noticed the numerous dead trees, stretching their leafless branches to the sky, and indeed in many spots a very large proportion of the trees, especially the beautiful hickories (*Carya tomentosa?* Nutt.), have fallen victims to the ravages of the Tremex, aided by the larvæ of a small coleopteron (a species of Scolytus) undermining the bark of those trees which have been rendered sickly by the borings of that handsome but destructive insect. Trees weakened by the Tremex larvæ, which bore perpendicularly upwards in the very heart of the wood, are very apt to snap off in high winds, long before they are killed outright. In such cases I have found that the fracture follows the course of one of their long borings, and I have taken the fully-formed insect out of trees with otherwise a perfectly sound and healthy appearance. The perfect insects make their exit from the trees in August and September, and although so abundant are but seldom seen on the wing. I did not meet with it in the woods to the north of the Ottawa, where the other Sireces were so numerous. It occurs at Sorel, on the St. Lawrence, forty-five miles below Montreal, and Mr. Gosse mentions it as having observed it in the Eastern townships.

Family Evaniadæ, *Leach.*

Pelecinus Polycerator, Fabr. (Needle Ichneumon). I have taken this remarkable insect at Sorel and Montreal, north of the Ottawa, in the township of Grandison, and at the Falls of Niagara, in August and September. At Sorel it is very numerous, though Mr. Gosse, who gives a good figure of it in his 'Canadian Naturalist,' and who speaks of it as occurring in the Eastern townships, observes that it does not appear to be common anywhere. The long hind legs, with their swollen tibiæ hanging down, as it slowly sails through the air a few feet above the ground, give it a very curious appearance, and impress the observer with the idea that the insect is carrying a heavy weight attached to its legs. It inflicts a slight prick with the point of its anal segment when captured in the fingers. I much regret that I have never had an opportunity of studying the economy of this most interesting species.

Family Ichneumonidæ, *Leach.*

Ichneumon Centrator, Say. Common about Montreal in July, and hybernating under bark of dead trees in autumn.

I. Brevicinctor. (*Vide* Dr. Emmon's 'Agriculture of New York,' Part Insects, 193). Montreal, July.

Trogus exesorius, Serv. In September, 1850, I obtained seven larvæ of the black swallow-tail butterfly (*Papilio Asterias*) feeding on parsley and other umbelliferous plants, in a garden at Montreal, which duly became pupæ; but during the following winter, to my great annoyance, every one of them produced a specimen of this parasite. The breeding-cage which contained the pupæ having been kept in a warm room, the ichneumons were evolved as early as January and February. In its natural state I have taken this Trogus flying in September, but there are probably two broods of it in the season, as there are of its victim, Papilio Asterias, the larva of which, according to Professor Kirtland, is known in Ohio as the "fennel worm," and is ocasionally destructive to the crops of fennel and dill in that state.

T. Obsidianator, Fabr. This large and handsome species is common about Montreal, in July. The sunflower (*Helianthus annuus*) is much frequented by this and other ichneumons, and in England I have observed many species to be equally partial to the Jerusalem artichoke (*H. tuberosus*).

Cryptus ——— *?* (Figured, but not named, in Dr. Emmon's 'Agriculture of New York,' Part Insects, pl. 27, f. 11). Common in July and August on the heads of wild parsnip (*Pastinaca sativa*) and golden rod (*Solidago*), plants which overrun the grass-fields about Montreal.

Lampronota ——— *?* (Figured, but not named, in Dr. Emmon's 'Agriculture of New York,' Part Insects, pl. 7, f. 12). Very abundant with the last species about Montreal, and I have observed it north of the Ottawa.

Pimpla ——— *?* I have bred a species very like our English P. Instigator from cocoons of the "muff-moth" (*Lophocampa Caryæ*, Harris; *Halesidota fulvoflava*, Walker). It makes its appearance in May and June.

Pimpla ——— *?* A species allied to the English P. turionella, which is very abundant in July, I have bred from cocoons of the "American lackey-moth" (*Clisiocampa americana*, Harris), so destructive to the foliage of the trees about Montreal, and there popularly termed "Montreal Blight."

Rhyssa Lunator, Fabr. This magnificent ichneumon is numerous on Montreal Mountain in August and the beginning of September. The females are easily captured when ovipositing in some stump or dead tree, for they work their ovipositors so deeply into the wood that

they are unable to withdraw them again quickly, frequently breaking them off in their efforts to escape; or when pulled violently away by a bird or entomologist, their long, hair-like instruments may often be seen sticking out of the stumps and trees they frequent. The stump from which I took the first specimen I ever saw was so hard and undecayed that I failed in making a hole in it with a strong knife deep enough to ascertain what the Rhyssa is parasitical on, nor did I ever succeed, though I made many attempts, in discovering what insect it infests.* Many people in Canada, ignorant of Entomology, suppose that it is this ichneumon which kills the trees by "stinging" them, as they term it, and accordingly destroy it when they have an opportunity; and small holes in the bark of trees, made by some beetle allied to Scolytus, have been pointed out to me as having been made by the "sting" of this insect and that of Tremex Columba. Between the anal segments of the female is a wide space filled by a loose, delicate, pea-green membrane, inside which her ovipositor, measuring in some specimens more than four inches in length, is partially coiled up, when she is boring into a tree, in order to shorten it and therefore increase its strength and stiffness. When the ovipositor is thus coiled up it swells out the membrane to the size of a kidney bean, which it much resembles in shape and colour, and the insect has then the most extraordinary appearance that can be imagined; and the first time I observed one engaged in ovipositing, I was at a loss to decide what this curious membranous bag could be. The females vary much in size, and the males are but rarely seen.

Family Formicidæ, *Leach.*

Formica herculanea, Linn. (F. lignivora, *Latr*). Swarms about Montreal, and in the woods north of the Ottawa, &c., tunneling through dead trees in every direction, gradually reducing the interior to a mass of dust. Wood in which it has made its galleries has exactly the appearance of timber which has been attacked by Teredo navalis. In the interior of a hollow but still living balsam fir (*Abies balsamea*) which had been attacked by this ant, and snapped across by the wind, I found the hard knots lying loosely amongst the dust and *débris*, having been gnawed all round to remove the soft wood, just as a dog would gnaw the flesh off a bone. "Misfortune," it is said, "makes one acquainted with strange bedfellows," and certainly Formica herculanea was not one of the least disagreeable with which I was compelled

* I have little doubt of the Rhyssa being parasitic on the larva of Tremex Columba; Rhyssa persuasoria is parasitic on Sirex juvencus.—*Frederick Smith.*

to share my blanket during the five months I camped out in the backwoods, when attached to an exploring party of the Provincial Geological Survey, and I was often awakened by a sharp pinch from the formidable jaws of one of these large ants, which had made the unpardonable mistake of supposing my leg to be a log of wood, and had accordingly commenced mining operations in it, and, like other creatures higher in the scale of Nature when in error, being extremely tenacious in adhering to its own opinion (and my leg) preferred to be torn to pieces rather than relinquish its hold.

F. nigra, Linn. Nests common under stones about Montreal. First active about the middle of April.

F. fusca, Linn. Abundant in rotten stumps on Montreal Mountain.

Family Pompilidæ.

Pompilus atramentarius, Dahlb. One specimen taken on blossoms of golden-rod, at the base of Belæil Mountain, August 30, 1857.

P. niger, Linn. Common, Montreal, July and August.

P. ——— ? A very active species, black with a red band across the base of the abdomen, is numerous about Montreal, hanging over the heads of umbelliferous plants and Solidago, in July and August. I have observed it burrowing in dry banks near Lachine. It inflicts an acutely painful wound with its sting when taken in the fingers.

Family Sphegidæ.

Ammophila luctuosa, Smith. Numerous on the sandy common at Sorel, in May.

A. urnaria, Klüg. Abundant at Sorel, where I used to find great numbers clasping the stalks of the garden Asparagus with their jaws, and at Montreal I have taken specimens hanging to the stems of the wild parsnip in a similar manner. I also met with this species when ascending the River Rouge.

Pelopæus cæruleus, Linn. (Dirt Dauber). This insect swarms, from the end of June to September, in the verandahs and wooden passages of houses, in the neighbourhood of Montreal, in the corners of which it constructs its clay nests. In a cell of one of these nests which I opened at the end of July, 1856, I found eleven spiders of different species, and a larva which appeared to have been but recently hatched. In about a week this larva had eaten up all the spiders and grown to many times its original size. It fell out of the broken cell, and tried to spin a cocoon against the sides of a wine-glass which I had placed

over it, but being very restless, after spinning for several days, became exhausted and died. The other cells of the same nest I kept through the following winter, and they produced the perfect insect in August, 1857. After spinning its semi-transparent cocoon the larva remains unaltered, excepting in shrinking up a good deal, till shortly before it changes to the perfect state. I have found great numbers of these nests under stones by the water-side, at Lachine, in July.

P. flavipes, Fabr. Not so abundant as P. cæruleus, but not uncommon at Sorel and Montreal. Mr. Gosse has published some very interesting observations on this species in the 'Zoologist' for 1844.

Family Crabronidæ.

Crabro singularis, Smith (*frigidus*, ♀, Smith). Taken up the River Rouge.

C. interruptus, St. Farg. (*confluentibus*, Say). St. Hilaire on the Richelieu, in August.

C. vagus, Fabr. (*trifasciatus*, Say). Common at Montreal, in July and August.

Cerceris deserta, Smith. Montreal, July.

Family Vespidæ.

Vespa vulgaris, Linn. Mr. Smith informs me that he cannot detect any difference between Canadian and English specimens of this wasp. It is abundant about Montreal, making its nests in holes in the ground, as it does in England. I fancied when I was stung by one at Montreal that the pain from the wound at the instant it was inflicted was more acute and burning than that from the sting of an English wasp, but it did not cause so much swelling, nor was it so lasting in its effects.

V. maculata, Linn. This wasp is abundant about Sorel, Montreal, and north of the Ottawa. The round nests, sometimes of very considerable size, are composed of a kind of paper made from the fibres of partially decayed wood, and are very numerous in swampy situations, attached to the branches amongst thickets of small poplar and white birch trees. On boarded fences, from the weather-beaten surfaces of which the wasps derive much of their material, small globular nests with a long neck, resembling an inverted decanter or water-bottle, are sometimes seen, and still smaller ones, quite round and of a very fragile texture, containing only half-a-dozen cells, are common under the roofs of verandahs and in similar situations. I do not know whether these various descriptions of nests are all formed by the same species.

There is a large black dipterous fly, a species of Milesia, banded with pale yellow, so closely resembling Vespa maculata in size, colour and markings that I have several times been misled by it. The females of this wasp remain in a semi-torpid condition under the bark of dead stumps, &c., till so late as the middle of May. It is extremely fond of "honey-dew," and may be frequently seen about plants infested by Aphides, scaring away their attendant ants by its large size.

Polistes pallipes, St. Farg. I found this insect very numerous at St. Hilaire, on the flowers of the beautiful golden-rods, in August, 1857, but I have never met with it elsewhere, and I know nothing respecting its habits.

Family Andrenidæ.

Colletes inæqualis, Smith. I observed great numbers of the males of this species flying backwards and forwards over a damp spot by the side of a road near Montreal, on the 26th of July, 1857.

Sphecodes ephippia, Linn. Not very common. Montreal, July.

Agapostemon tricolor, St. Farg. Common about Montreal in August.

Auxochlora lucidula, Smith. On the 24th of August, 1856, I found a nest of this beautiful little bee under the bark of a decayed stump on Montreal mountain. There were thirteen cells arranged perpendicularly in a single row, and composed of particles of decayed wood, very slightly agglutinated together: the four uppermost cells contained larvæ; in the next eight were pupæ in different stages of development, the last having partially acquired its brilliant green colour; and in the thirteenth and lowest a bee fully formed and active, as I found to my cost, for it stung me acutely, and effected its escape from my fingers. I only succeeded in rearing two of the pupæ, which were full-formed on the 4th of September following, the rest and all the larvæ having died and dried up.

A. viridula, Smith. I took a specimen of this species on the flowers of the golden-rod (*Solidago altissima?* Linn.) on Belæil Mountain, on the 30th of August, 1857.

Halictus parallelus, Say. Common in August about Montreal and St. Hilaire.

Andrena nubecula, Smith. Montreal, August.

A. varians, Rossi. On willow catkins at the beginning of May, near Montreal.

Family Cuculinæ.

Nomada. Several unnamed species are numerous about Montreal

at the beginning of May, in the blossoms of the yellow dog-tooth violet or adder's tongue (*Erythronium Americanum*) and on the catkins of willows. I have presented specimens of them to the British Museum.

Cælioxys. An unnamed species is common at Montreal and St. Hilaire in August. It appears to me to come near C. vectis, *Curtis.*

Stelis ——— ? A species bred from wild rose twigs bored by Osmia.

Family Dasygastræ.

Osmia simillima, Smith. Taken on the River Rouge, in the township of Arundel, county of Argenteuil. It much resembles O. Latreillii, *Spin.*

O. ——— ? A small species is common at Montreal in July, and I obtained it from bored wild-rose twigs, which I collected round Montreal in the winter of 1856—7.

Megachile acuta, Smith. Very numerous at Montreal, and I took it on the river Rouge, in the township of Arundel. In July nearly every leaf of the rose-bushes in gardens has a circular piece or two cut out from it, but I never saw this bee actually operating on one, though I have captured a female when in the act of cutting a piece out of the leaf of a seedling maple. I once found some old nests of a species of Megachile ? composed of the petals of buttercups (*Ranunculus*) in the crevices of stones in a loose wall. As M. acuta is very like M. Willoughbiella, it is not improbably the species referred to under the latter name by Mr. Gosse, in his 'Canadian Naturalist.'

M. melanophæa, Smith. Occurs abundantly about Montreal at the same time as the last species.

Ceratina dupla, Say. Abundant in July on blossoms of Solidago about Montreal. In February, 1857, I collected numerous shoots of a bramble which had been bored by these bees, and I found six or seven specimens inside them, lying head downwards in a torpid state, having apparently entered them to hybernate, and so late as the 19th of May following I found numerous specimens in bramble-shoots, but they were then active when disturbed. In some, below the perfect insects, were brownish larvæ and cocoons. Many of the shoots, several feet in length, were bored down to the very root. In one I found a bright green larva, like that of a sawfly, which appeared to have been feeding on the pith, and I also met with the nests of a minute Crabro ? (*Rhopalum*, Kirby) filled with Aphides.

Family Scopulipedes.

Melissodes rufo-dentatus, Smith. Montreal, August.

M. denticulata, Smith. A female taken at Montreal in August, 1856, and a male asleep in a head of Hieracium canadense, in the township of De la Wherry, county of Argenteuil, at the end of July, 1858.

Bombus terricola, Kirby. Appears about the middle of May, and is not very numerous.

B. fervidus, Fabr. This and the next species are the most abundant Bombi about Montreal. The females appear about the middle of May, and the males are very numerous in August. I took this species up the river Rouge.

B. ornatus, Smith (*ternarius*, Say ?). Very abundant, with the last species, at Montreal and St. Hilaire.

B. vagans, Smith. Montreal, August; rare.

B. elatus, Fabr. With the last, and at St. Hilaire.

Apis mellifica, Linn. Hive-bees are frequently kept in Lower Canada, and the fields, covered with thistles and buckwheat, afford them an inexhaustible supply of honey.

W. S. M. D'Urban.

London, May 10, 1860.

Proceedings of Societies.

Entomological Society.

June 4, 1860.—J. W. Douglas, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'On the Cultivation of Silk at Mussooree, Himalaya Mountains, with Notes on the Treatment of the Silkworm;' presented by the Author, Capt. Thomas Hutton, F.G.S., Superintendent of Government Silk Plantations. 'On some New Longicornia from the Moluccas;' 'On some New Anthribidæ;' by the Author, F. P. Pascoe, Esq. F.L.S., &c. 'The Journal of Entomology,' No. 1; by the Proprietors. 'The Zoologist' for June; by the Editor. 'Proceedings of the Royal Society,' No. 38; by the Society. 'Tijdschrift voor Entomologie,' Vol. ii. Part 6, Vol. iii. Parts 1, 2 and 3; by the Entomological Society of the Netherlands. 'A Catalogue of the Lepidopterous Insects in the Museum of Natural History at the East-India House,' by Thomas Horsfield, M.D., Ph.D., F.R.S., Keeper of the Museum, and Frederick Moore, Esq., Assistant, Vol. ii.; by the East India Company. 'The Athenæum' for May; by the Editor. 'The Journal of the Society of Arts;' by the Editor. 'The Entomologist's Weekly Intelligencer,' Nos. 188—191; by the Editor.

Exhibitions.

Mr. Stevens exhibited a specimen of Criomorphus castaneus, found alive in the playground of a school at Blackheath. He observed that the species had been recorded as British, by the name of Callidium luridum, but he believed its claims to be considered a native were rather doubtful.

Mr. W. W. Saunders exhibited two specimens of Papilio Antenor, *Drury*, sent from Madagascar by Mr. Layard, and read the following note of their capture by that gentleman. "I have sent two not very good specimens of Papilio Antenor of Drury, which I shot at Boyana Bay, Madagascar. They fly very high, and I could not obtain them in any other way. I have two more from the French missionaries, who said they did sometimes come down."

Mr. Bond exhibited two living examples of Acrocinus longimanus, and two specimens of Deilephila lineata, caught near Brighton on the 12th and 14th ult. He also exhibited two dead pupæ of Sphinx Convolvuli, found last autumn in a potato-field near Canterbury; and an enormous cocoon of Eriogaster lanestris, three larvæ having united in forming it.

Mr. Stainton exhibited specimens of Deilephila lineata from Lewisham and Torquay.

Mr. M'Lachlan exhibited specimens of a species of a species of Cecidomyia, which he had bred from small galls found on buds of the common broom.

Mr. Janson exhibited Sphærites glabratus, Rhinomacer attelaboides and other Coleoptera from Scotland.

Mr. Stainton exhibited Lithocolletis Helianthemi, bred from larvæ mining in leaves of Helianthemum vulgare, received from Ratisbon; and a specimen of Aspidisca splenderiferella, an American species of Tineina, bred from Cratægus tomentosa.

Mr. Moore exhibited a living example of the Eria silk moth (*Attacus Ricini*) bred from a larva which fed on the castor-oil plant.

Mr. Gorham exhibited the following Coleoptera:—

Dinarda dentata. Taken by Mr. Crotch in nests of Formica fusca.
Haploglossa rufipennis. Taken in sandpits near Addington.
Mycetoporus lucidus. Wimbledon Common.
Eucephalus complicans. Charlton.
Lathrobium punctatum. Hammersmith.
Læmophlæus duplicatus. Near Farnborough, Kent.
Chryphagus micrographus. Isle of Wight. Of this species Mr. Lewis had taken a single example near Croydon.

Mr. Tegetmeier exhibited some remarkable specimens, illustrating the production of fertile workers in a hive of the ordinary honey-bee (*Apis mellifica*). They were produced by placing, in March, a comb containing eggs and larvæ in workers' cells only in a hive which had been some time without a queen, and which consequently contained no brood whatever. There was no apparent attempt made by the bees to form a royal cell and to rear a new queen for the workers eggs, but after the latter were hatched the bees produced from them laid eggs. These were deposited in the drone cells only, sometimes as many as six being placed in one cell, of which only one was hatched, a drone in all cases being produced. It was noticed that these fertile workers were hatched and laid eggs before any drones had been observed in the adjacent

hives. Huber supposed that such workers were produced by partaking of some of the food designed for the production of a queen, which had been deposited in the cells adjacent to the royal one. This supposition was disproved, as there was no royal cell in the single comb which the hive contained.

Mr. S. Stevens communicated the following extract from a letter from Robert Clark, Esq., and exhibited a specimen of the fly alluded to therein :—

"These insects are pretty numerous in the windward division of the Gold Coast, in March, April, May, November and December, especially in the three former months, before the first rains set in, when the weather is generally close and oppressively hot. As soon as they are observed, either in or about the houses of the Europeans or natives, everything is done to get rid of them, for when they alight on the person they inflict a painfully stinging wound, rapidly followed by a wheal, which becomes the seat of an annoying itchiness. The proboscis, as you may have noticed, is strong and keen, and they readily push it through thick clothing and thin leather. Horses and other beasts of burden suffer severely from their attacks, and there are good grounds for believing that this is the cause why no animal of that description will live upon the windward part of the Gold Coast; indeed, my friend Mr. R. D. Ross was so persuaded of this being the case that he made a strong representation to the head of the Commissariat Department to that effect, suggesting, at the same time, that hammock instead of horse allowance should be granted to the officers of the G. C. A. Corps stationed in the windward districts.

"In 1858 I procured from the late Mr. Consul Campbell, of Lagos, four horses for the use of some of the officers stationed at Cape Coast Castle. They arrived in fair condition, were well stabled, carefully groomed and fed, nevertheless in six or eight weeks from the date of their landing they were all dead. This did not seem to me to arise from the grass, as it was in every respect quite equal to that on which horses feed and thrive admirably on the leeward division of the Gold Coast, at Sierra Leone and the Gambia. The precaution of partly drying it before it was given to the animals was not neglected, and their food was varied with ground nut-straw, which is considered capital fodder for horses both at Sierra Leone and the Gambia. The late Mr. Brodie Cruikshank even imported hay and oats from England, conceiving (I am of opinion incorrectly) that the mortality of beasts of burden depended upon some poisonous herb being mixed up with the grass on the part of the Gold Coast I refer to, but as might be anticipated the experiment in question proved a complete failure.

"With regard to these insects I think I told you that a Mr. Glydden, purser of H.M. store ship 'Buffalo,' to whom I showed them on the Coast, insisted that they are identical with the tzetze described by Dr. Livingstone, alleging that he had met with them in some of the regions of Southern Africa which he had visited."

Mr. Westwood remarked that the insect exhibited was closely allied to the common Tabanus bovinus of Europe, and certainly not the "tzetze" met with by Dr. Livingstone and others, as was asserted in the latter part of the letter just read.

Dr. Wallace communicated the following:—

Remarks on the Occurrence of Rarer British Sphingidæ.

"The fact that in many female Sphingidæ captured in Great Britain and Ireland, in the autumn months, no ova have been found, induces the question as to whether some species may or may not be continuously indigenous. Many think that the absence

of ova in the female is merely a question of time, as in the case of A. Atropos, the females of which, notoriously devoid of eggs in the forced autumn specimens, are found in June depositing ova, whence the brood is perpetuated. Others maintain that it is a question not of time only, but also of place; for taking S. Convolvuli, females of which are constantly taken in the autumn months, almost invariably without eggs (in 1846 and 1859 the species occurred most freely: one individual took nearly fifty specimens in 1859, all the females of which were destitute of ova). In this case either a female is hatched in the autumn with eggs, hybernates and deposits ova in the spring, or emerges in the spring from the pupa, or else specimens fly over from abroad and deposit ova in this country. I would ask has ever S. Convolvuli been taken or observed in the spring or early summer in this country, and if so in what condition or of what sex? Are we to look for a development of females of D. Lineata without eggs, in the autumn months, if a hot summer intervenes? A series of observations carefully made as to time, place, condition, sex, and also as to the complete development of sexual organs of any or all of the rarer Sphingidæ, would help to resolve the question. Without giving any opinion myself, I may add the truth can only thus be obtained:—from a series of observations, not from a single capture. Have any of the commoner Sphingidæ, the Smerinthi or others, occurred in the autumn months, and if so were they fully developed? Are any of the rarer Noctuæ to be looked upon in the same light?

"This question appears of more importance than the double-broodedness of some Notodontidæ, about which so much has been written, and I commend it to the attention of entomologists."

Mr. Smith read an extract from Park's 'History of Hampstead,' in which it was stated that in 1782 great numbers of "vermin" appeared on the hedges and trees in that neighbourhood, and that men were employed to beat them off with poles and burn them. These persons experienced considerable irritation on the face and other exposed parts of the person, whilst those who incautiously inhaled the fumes produced by burning them were much indisposed in consequence.

Mr. Stainton considered these "vermin" were the larvæ of the brown-tail moth (*Porthesia Chrysorrhœa*), which had in former years appeared in immense numbers in this country, and the hairs of which and many of its congeners were well known to produce much irritation of the human skin.

Mr. Smith also read the following papers:—"Observations on Cynips lignicola and C. Radicis," and "Descriptions of new Species of Australian Hymenoptera and of a Species of Formica from New Zealand."

Mr. Baly read a paper intituled "Description of some New Species of Sagra; Remarks on that Genus; and the Characters of Cheiloxena, a New Genus belonging to the same Family."—*E. S.*

Eccentricities in the Habits of Foxes. By W. H. Slaney, Esq.

As a zealous preserver of foxes in the hunt to which I belong, and having, in consequence, a good deal to do with gamekeepers and rabbit-catchers within an extensive district, I have many opportunities of ascertaining how it happens that so many both of old and young

foxes come to an untimely end. Many are the litters of foxes which are starved to death by the old foxes being destroyed before the young ones can do for themselves; this is often occasioned quite unintentionally and for want of a little forethought, and at other times done from spiteful and vindictive motives, and from a short-sighted view of what is mistakenly supposed to be of advantage to the destroyer. The great mischief arises from the rabbit-trappers' method of setting their traps in a dangerous manner, which might easily be avoided; but these men think that by setting them so as to catch the foxes it will be the means of preserving the rabbits, and secure to themselves a greater profit. In most places where there are many rabbits a set of men are employed to catch them, and, having been been brought up exclusively to this occupation, thoroughly understand how to do so effectually; but instead of confining themselves to their legitimate occupation, they often foolishly try to kill the foxes, because they take from the traps and snares some few of the rabbits for which these men would otherwise obtain sixpence a couple; and, if the farmers are allowed to have the rabbits for themselves, as is frequently the arrangement now made, they will obtain one shilling or one shilling and sixpence per couple more for their own advantage, and thus make on a farm, of say three hundred acres, from eight pounds to ten pounds a year, where rabbits are plentiful, besides well supplying their own household. It will be found an excellent plan to give the rabbits to the tenant, he paying the man for catching them, but the landlord reserving to himself and his agent the exclusive right to appoint a proper and trustworthy person to catch the rabbits. The object of the landlord reserving to himself this right is that it prevents his game being destroyed, by not allowing the men to set their traps in a wrong manner, in open places or in meuses, which they ought never to do, but only down the rabbit-holes, leaving a few links of the chain attached to the trap above ground; this will effectually prevent any old fox being taken. Should the rabbit-catcher wilfully neglect these simple precautions, he will then lose his employment altogether, and become a marked man in the neighbourhood, as a fox and game destroyer whom no one will employ. As a further inducement to be honest it is well worth while to pay these men a few pounds, at Christmas or some other time, as a recompence for the injury the foxes occasionally do them; by this means they will soon find it is better for them to avoid foul play than secretly to adopt it.

I am doubtful whether the following anecdote of a male fox supplying the place of a female or vixen, which had been un-

fortunately destroyed, and taking upon himself the feeding of their young progeny, is of such rare occurrence as to be a fact worthy of insertion in the 'Zoologist;' but although I have heard of stories to a similar purport I was never before satisfied of the correctness of such statements. I have frequently inquired of huntsmen, keepers, and other persons most likely to know, if such was really the case, and the answer has generally been, they "believed so," but none seemed to know it from experience. The following fact, however, may be relied upon.

A vixen laid up her litter of five cubs in a retired spot, under a projecting rocky shelf, in a small dingle belonging to myself, but adjoining to which, unfortunately, there was one small field or paddock not mine, in which the tenant's sons were accustomed to set traps for rabbits; through this field the poor vixen had often to go to obtain food for her litter; and at last, after the young ones had attained a considerable size, and had become fine merry-looking fellows,—bold enough to stand near the mouth of the earth, regardless of being seen by those who cautiously resorted to the spot to watch them,—the poor mother was caught in a trap, and, after carrying it about for some time, she got it off, but unfortunately some men at plough saw the poor maimed fox, and ran after her and finally beat her brains out, when almost close to her earth and cubs.

The rabbit-catcher employed near the spot, who was also paid for looking after the foxes, having been told of this mishap and of the anger the ploughmen had met with from their master, when informed of their having killed the poor vixen, went the next day to look at the earth, and there saw a fine white-plumed hen lying near it, which was not there the preceding day, and must therefore have been brought by the father of the family. The man then left a few young rabbits for the cubs, and the next day found the rabbits and fowl consumed. He continued occasionally to take the young foxes a fresh supply of rabbits, rats or other food, for two or three days; and shortly afterwards he again found laying near the mouth of the earth, amongst the remnants of other things, a black fowl, brought there like the former by the only remaining old fox, and no doubt many other articles of food had been taken down to their earth by the young foxes to feed on in private: this plan of the man and the old fox alternately supplying the young cubs continued for several weeks, until two oak trees which grew on the bank above their residence were ordered to be cut down, when, unluckily, the trees fell exactly across the foxes' habitation; and since this neither old nor young foxes have been seen

there, and no doubt the old fox led the young ones to some more concealed retreat, of which there is one only a field or two distant. That this has been the case there can be little or no doubt, the young foxes being old and strong enough now to feed themselves, with little or no aid from the old fox or the man; but their new place of concealment must have been selected for them by the former, for until they thus bodily decamped they never were known to go further away from the earth they were bred in than a few yards at a time, and were totally unacquainted with the nature of the country around. I have more recently been assured that they have taken up their abode in a small cover a few hundred yards distant from their former home, but in which no earth for them to retreat into has been discovered; I am therefore inclined to think this forced emigration from their birth-place is not intended to last for any great length of time, and ere long a return home may be expected, the corn-fields and vegetation in general being still so backward as to afford little or no shelter to the young foxes, who, in warm dry weather, are very fond of making themselves a play-ground and summer haunt in the centre of some quiet corn-field or other sequestered spot, where they can lay about and enjoy the sun's warmth unmolested by the intrusion of any unwelcome visitor, either biped or quadruped. Whether *pater familias* in the present case deems his duties towards his progeny to have been sufficiently performed, and therefore that it is unnecessary for him to look further after their future welfare, may be doubtful; but now that they have lost that almost indispensable advantage to all young families, the prudent advice and caution of an experienced mother, I have some apprehensions as to their being able to escape the dangers attendant upon their early entrance into active life; curiosity may induce them to venture a trifle too near the rabbit-catchers' concealed trap, though properly set, so that no old fox would be deluded into its fatal grasp; or their presumptive boldness may cause them incautiously to seek a too early acquaintance with the inmates of the neighbouring poultry yard, before being aware of the guardian terrier or other dog placed there in watchful anticipation of some such midnight visitation. If, however, they are lucky enough to escape these and similar evils incident to early life they may then hope to prove their gratitude for the care bestowed upon them, by producing themselves in good health and condition towards the beginning or middle of October, when called upon by a gentle admonition of the huntsman's horn to come forth and show themselves to their admiring friends.

That these young foxes were long supported and fed by the old

dog-fox there can be no doubt; whether such would have been also the case had the vixen been alive I cannot say, though I have heard it said both parents do assist each other in this labour of love. I may here add a word on the nature of the food on which foxes feed, and of this there is scarcely any kind of which they will not thankfully partake, when a little pressed by hunger, in frosty and bad weather,—poultry, game, rats, rooks, a dead (skinned) sheep or lamb; for, except in the mountainous districts of Scotland and Wales and some parts of the North of England, where rabbits and other food are not to be had, I deny that foxes kill sheep or lambs, though such is, I am aware, often ignorantly laid to their charge, and in many instances, after due inquiry, I have succeeded in proving to those who insisted on the contrary how totally unfounded is this accusation. A dead lamb just born may occasionally be taken, but not a lively and well-to-do one, which, if found to have been killed, has been destroyed by some dog, or, if missed, is found afterwards starved to death in a drain, or hung fast in a bramble, or lost in some neighbouring plantation or copse. A part of a dead horse or cow, or almost any kind of garbage, is all welcomed where there are young ones, but nothing is more kindly taken to by foxes than rats, of which I have often sent them dozens at a time, after the slaughter occasioned by taking down a corn-rick, when I thought the old vixen was somewhat pressed to supply her young, and the next day the dead rats were sure to have all disappeared. During the winter season, when snow is on the ground, it is a curious sight to trace the foxes along the sides of a small trout-stream, where rats abound; near this place, when the waters are somewhat out and the rats are driven from their holes, it is not an unusual thing to shoot fifty or sixty in the course of a few hours. In following the course of this little stream the marks appear in every direction in the snow where the foxes have passed and re-passed night after night in search of the rats and moor-hens, and many places show where a fox has captured a rat while it was sitting at the edge of the water, little thinking of the stealthy approach of the foe behind it.

Amongst the almost universal food foxes partake of I was not till lately aware of their feeding on fish, which it may be thought difficult for them to catch; but it is a well known fact that the polecat, a smaller if not less active animal than the fox, is in the habit of supplying itself with eels for winter consumption, deposited in some safe hole or place near its retreat, and, singular to say, these unfortunate eels are not quite deprived of life before being stowed away, but are only so far nipped or bitten in the neck or back of the head as to pre-

vent their getting away, and thus they are kept in a fresh state for a long time for their merciless captor's supply. Yet how, it may be asked, could the polecat catch this nimble kind of food? Such, however, is the case.

Close at hand here an old vixen and a litter of five cubs had taken up their quarters in an old broomy bank containing a great number of rabbits, which might have been seen running about in every direction close to where the young foxes were accustomed to come forth with the old vixen to enjoy the warm sun and "to recreate themselves," as is said of other animals in one of the fine old glees sung at the glee clubs in former days. Wishing to ascertain if foxes would feed on fish, I thought this a good opportunity to try the experiment; although, the spot being close to a small stream where very shortly before three otters had made their appearance (one of which had, however, been caught by a pack of otter-hounds invited for that special purpose), I had some doubts whether the otters might not claim some share of the fish: I nevertheless determined to put down a brace of very large carp, weighing from fourteen to fifteen pounds each, and which I had found in a very forward and decomposed state in one of the adjacent pools. These two far-gone fish very vividly recalled to the mind the attributes of Caliban, who bore about him "a very ancient and fish-like smell," but hardly equal to that of the two carp. Thinking this might perhaps prove attractive to the young foxes, I desired the two fish might be carried to the bottom of the bank and placed in a conspicuous place, where, without disturbing the foxes, their method of proceeding might be observed. At first no attention seemed to be paid to these high-flavored temptations; but I should mention that, it being just at the time when rook shooting was going on, the young foxes in consequence obtained a large supply of old rooks, some killed by accident and some purposely, but which were too old and tough to be converted, like their progeny, into pigeon-pies, and were further aided by the addition of all the old rabbits which the keeper took in his traps and snares during the night. Whatever might have been the cause, whether the wind (for it was then very hot weather) was not quite in the right quarter to attract the young foxes to this savory meal, certain it is that the two fine carp remained for the first night and day within sight untouched and unnoticed; but on the second night a very different result took place, and, if I remember correctly, it was on a Friday, which might have had something to do with the change which so suddenly took place, for on this same Friday the two fish disappeared, a few of the bones and scales being all that was left to show

their former whereabouts. When it is remembered that carp are a very close-grained and firm fish, thirty pounds weight of such delicate repast might be deemed sufficient to save these young foxes from complaining of being harshly treated and put on a fasting fare.

WILLIAM HENRY SLANEY.

Hatton Hall, June 12, 1860.

Parturition of Bears.—The fact that the parturition of bears occurs during hybernation was mentioned long ago, I believe in Lloyd's 'Field Sports in the North of Europe,' but it is many years since I saw the book, which it is now utterly out of my power to refer to. Though the main portion of that amusing work consists of sporting adventures, it is interesting also from the information it affords on various points of Natural History.—*Arthur Hussey; Rottingdean, April* 17, 1860.

The Common Bat (Vespertilio pipistrellus) *Flying at Mid-day.*—I was extremely surprised on Sunday last, April 8th, whilst walking in the grounds of Downing College, at mid-day, to have my attention drawn by a gentleman to a bat, briskly flying about in the open glare of the then brightly shining sun. The bat appeared to be in pursuit of some insects flying around a row of lime trees. Is this of common occurrence? If so, would one of the able readers of the 'Zoologist' kindly inform me, as I am not aware of a similar instance being recorded.—*S. P. Saville; Jesus Terrace, Cambridge, April* 13, 1860.

[Many other similar instances are recorded in the 'Zoologist.'—*E. N.*]

A Bat Flying in the Sunshine.—On the 30th of April, being a bright clear day, about two o'clock in the afternoon I was surprised by seeing a bat flitting up and down the lawn in front of the house, apparently unaffected by the dazzling sun, which was shining brightly at the time. I succeeded in obtaining it, and it proved to be the common small black bat, which is, I understand, gradually becoming scarce.—*J. H. Belfrage; Muswell Hill, May* 4, 1860.

Birds of Amoy.—I have often observed the osprey flapping slowly along with its heavy *buteonine* flight over the deep bay between the island of Amoy and the high Pagoda-topped hill of Nan-tai-woo, and have on other occasions seen him sitting erect on some oyster-stone on the river sand-flats, but his shyness has always evaded approach. Winter and summer a bird of this species is often to be met with. I can at last announce with satisfaction the acquisition of a fine female. A Chinaman brought me the bird, shot, as he informed me, at Quemoy. I took down the following notes from the specimen while fresh. Length, 22½ inches. Wing from flexure, 19½, extending 1 inch beyond the tail. Expanse, 62. Tail, 9. Bill from base of culmen to tip in a direct line, 1½; along the ridge-curve, 1$\frac{7}{10}$; cere, ¼; edge of lower mandible, 1$\frac{6}{10}$; depth at the base, $\frac{8}{10}$. Tarsi, 2$\frac{3}{10}$. Mid toe, 2; its claw along the curve, 1$\frac{6}{10}$; outer toe, 1$\frac{7}{10}$; claw, 1$\frac{8}{10}$. Inner toe, 1½; claw, 1$\frac{7}{10}$. Hind toe, 1$\frac{3}{10}$; claw, 1$\frac{7}{10}$. Bill bluish black; base of upper, and basal half of lower mandible, deep leaden blue; cere also leaden blue. Iris bright yellow. Legs pale bluish white, occasionally patched with a leathery

tinge. Claws black. A comparison of the dimensions of this female with McGillivray's description of the female osprey shows how much smaller our bird is. Ours tallies more nearly with the description in the 'Fauna Japonica' of the variety from Japan, spoken of as the Pandion Haliætus orientalis, which is referred to Gould's Australian species, Pandion leucocephalus. The bird is known to the native fishermen as the He-pew or Fish-tiger. I was much delighted the other day in watching a pair of avocets feeding in the mud at the head of the harbour. They walked steadily, the one following the other, flourishing their beaks from side to side through the mud with a measured and graceful motion, recalling to mind somewhat the play of mowers' scythes as the mowers slowly advance in order through a field of grass. The idea, however, may be rather fanciful. I did not shoot the birds, but I have no doubt that they were the true recurvirostra, a specimen of which I have received from Swatow, a few miles down the coast. This is the first winter that I have procured the sanderling and turnstone, two birds almost cosmopolite in their distribution. Among specimens of the former I can find no difference in size from those in McGillivray. The bird at first sight looks like a Tringa with its ordinary tints partially washed out, but a closer examination shows many points of difference. The forehead is full and round, almost as in the Charadriadæ. The beak is short, broad, black, and polished at the end. The feet are broad and rough, and the hind toe minus. I have two specimens of the Strepsilas Interpres, a male and a female, and as they differ somewhat, though triflingly, in size from the British bird, I will here mention measurements taken from the fresh examples:—

	Length.	Wing.	Tail.	Bill.	Tarsus.	Mid-toe.	Claw.
Female . . .	9	$5\frac{9}{10}$	$2\frac{1}{2}$	$\frac{9}{10}$	$1\frac{1}{12}$	$\frac{19}{20}$	$\frac{2}{10}$
Male	$8\frac{8}{10}$	$5\frac{6}{10}$	$2\frac{4}{10}$	$\frac{10}{12}$	$1\frac{1}{12}$	$\frac{19}{20}$	$\frac{2}{10}$

The bill in both sexes is of a dark bluish or neutral tint, approaching to black. Inside of mouth flesh-colour, with more or less brown. The male is blacker and brighter in tints, and has its legs of a fine bright orange-red, whereas these tints in the female are tinged with a dull brown.—*Robert Swinhoe; British Consulate, Amoy, February* 21, 1860.

The Oil-gland in Birds.—Many and many a time have I communed with you on the oil-gland of birds; I will now resume the subject, without, however, quoting a single line from my old grandmother's library in support of its supposed uses, or adverting to remarks in the pages of a late periodical, now happily defunct, to the manifest advantage of orthodox Ornithology. It so happens that I have daily, and I may add hourly, opportunities of watching narrowly the habits of some forty barn-door fowls. All these birds, with now and then a few ducks in company, are everlastingly preening every part of their plumage which can be reached through the application of the bill. Let us take the common notion for granted, that birds do actually squeeze a substance from the gland and then apply it to the plumage, although I defy any living man to declare that he has ever detected the smallest portion of this mysterious lubricating fluid, either in the bill of the bird or on the plumage. Now all and every one of these forty birds may be seen applying their bills to their rump, and all, without a single exception, using the same mode in the general preening of their plumage, *precisely* the same mode. Well, but three of these birds have no tail, and of course no oil-gland. Still, after the operation of preening has been gone through, the feathers of these three birds are beautifully glossy, and no eye can

discern any difference whatever betwixt them and the feathers of those birds which possess the oil-gland. These are facts undeniable — not theories; what say you to them? If the lubricating system with oil from the gland holds good in birds, why should it not equally hold good in beasts? I have here a favourite Tom cat, and I often see him apply his mouth to his posterior regions: who knows but that Tom is then procuring wherewith to fertilize his fur and increase its wonted brightness? —*Charles Waterton; Walton Hall, June* 8, 1860. *Communicated by Dr. Hobson.*

Arrival of Summer Birds.—While in the garden here, on the 6th of April, the weather having been cold and dull for some time, I observed a small bird, which, from its general appearance, I imagined to be the chiffchaff, perched upon a shrub, from which it flew down from time to time, apparently in pursuit of flies, much in the manner of the flycatcher, though up to this time, probably owing to the inclemency of the weather, I had not heard its peculiar note. The next day, however, being warm and sunny, I for the first time heard it in the morning, and it continued for intervals throughout the day, thus confirming my previous observation. On the 19th I shot a wryneck also in the garden in very good condition, and on the 23rd of the same month, in the afternoon, I saw a blackcap on one of the upper branches of a larch, singing melodiously; indeed I have noticed an unusual number of these birds this season, many of them in remote situations. About this time I also heard the whitethroat. On the 25th of the same month a pair of swallows were seen by me for the first time this season, being the same day on which I first noticed them last year, in a different part of the country, though the summer was much more advanced. Owing to the lateness of the season, I have heard it remarked that the migratory birds have been much later in their arrival, but I cannot say this has been the result of my observations.—*John Henry Belfrage; Muswell Hill, May* 4, 1860.

Occurrence of the Osprey (Falco haliæëtus) *at Sherburne.* — A very fine male osprey was shot near the mill-dam at Sherburne by one of the keepers of Sir T. D. Ledgard of Ganton Hall. It had been seen about for some time previously, and traps were set for it, but did not succeed. It was afterwards seen with a trout, and was shot. The bird has been forwarded by Sir T. D. Ledgard to me to be preserved.—*A. Roberts; Naturalist, King Street, Scarborough, June* 2, 1860.

Occurrence of the Sparrow Owl in Yorkshire.—I do not recollect ever mentioning to you for insertion in the 'Zoologist' an account of my having received from a young clergyman, a son of Mr. Bury, who has the church at Osbarton (my brother-in-law Mr. Foljambe's place), who, knowing I had a very fine collection of British birds, sent me a small owl in a very curious case, which was shot in the East Riding of Yorkshire, not far from Beverley, by a keeper, a brother of Sir Thomas Whichcote's keeper, of Asworley, Lincolnshire. He sent this bird to his brother, who gave it to Mr. Bury, from whom I received it. I found out afterwards, from looking at Audubon's 'Birds of America,' that it was the sparrow owl (*Strix acadica*), which is rather common in some parts of America, but totally unknown in this country.—*W. M. E. Milner;* 17, *Brunswick Terrace, Brighton, June* 16, 1860.

A Tame Cuckoo.—I am enabled to give the biography, unluckily but a short one, of a cuckoo which was taken late last summer from the nest of a greenfinch, and came into the possession of a shoemaker's wife, a great petter of birds, in the village of Staverton, Northamptonshire. I first heard of the bird early in January from a lady, my sister, who had seen it a few days previously. It was fed upon meat and eggs, was brought up—unconfined—in the living room of the cottage, where it perched as

near the fire as practicable, and was as tame as a cat, one or two of which animals were its companions and playfellows. The night was passed in a box covered up close to the fireplace. When the cuckoo was visited by my informant it appeared like a young bird not fully fledged, but its mistress stated it to be then moulting, and that it had been well feathered some time before. That the cuckoo had survived the severe cold of last December was a circumstance to afford some hope of preserving it through an English winter, though on the other hand the fact of its moulting during that season was unfavourable to such a prospect. However, the bird lived some time longer, but I heard a few weeks ago that it had died (appropriately ?) on the 1st of April, so that this experiment to acclimatize a cuckoo, if promising at the commencement, has not succeeded better than others.—*Arthur Hussey ; Rottingdean, June* 16, 1860.

Return of a Hooded Crow to a Walled Garden in which it had been confined.—Some of your readers may probably recollect the curious example of instinct shown by a herring gull which for some years has been in the habit of returning each winter to the Zoological Gardens, where it was reared. A yet more singular instance has lately come under my observation. In the beginning of the winter 1858—9 a hooded crow, slightly wounded, was given to the son of Mr. Vaux, brewer, Sunderland. The crow was turned into a walled garden and poultry yard, and fed regularly with the fowls, whom it exhibited no inclination to molest. It soon recovered, but remained, though never pinioned, until the month of March, 1859, when it disappeared. This winter it returned to the garden and joined its old companions of the poultry yard ; nor did it, up to a fortnight ago, ever quit the premises, feeding with the hens, and roosting every night in its accustomed tree. The kindness with which it had been treated has won its confidence, and it exhibits no more fear of man than does a domestic fowl.—*H. B. Tristram ; Castle Eden, Ferry Hill, April* 5, 1860.

Occurrence of the Serin Finch (Fringilla Serina, *Linn.*) *in England.*—On a recent visit to Brighton I was shown a specimen of this bird that was caught in a clap-net near there, on the 20th of June, 1859. It is in the possession of Mr. H. Pratt, of 35, Duke Street, Brighton, who had the bird very shortly after its capture. It was described as being quite alone and very wild. I believe it is a female. I have since seen another, a fine male, captured near London last autumn, shortly after the severe storm in October. I believe this is the first time this bird has been recorded as a visitor to this country.—*Frederick Bond ; Cavendish Road, June* 7, 1860.

Localities of Sylvia Luscinia.—In Professor Kinahan's very interesting paper on Migratory Birds, published in the 'Zoologist' last month, some remarks occur regarding the English localities of the nightingale (*Sylvia luscinia*). Having studied the subject so carefully as he has done, I presume Dr. Kinahan is acquainted with all published records hitherto made ; if so, I have several new localities to add to those named in his paper ; and I think it right also to point out that he is in error as regards the assertion, "It is common only in the easternmost of these shires," meaning the easterly portion of England. Wiltshire is not among those enumerated by Dr. Kinahan, yet the nightingale not only occurs in both north and south of it, but is extremely abundant in my neighbourhood. In the woods of Clarendon Park, and all about Farley and Alderbury, it may be heard singing all day long as well as at night, and not merely a single individual here and there, but generally several in one spot. I have also met with the nightingale in the south of Dorsetshire, at Wareham, where it is not infrequent, and

have heard of its occurrence in North Dorset, at Shaftesbury, and again in Northamptonshire, near Northampton, as also in Surrey, at Clapham Park. These are all additional localities to those mentioned in Dr. Kinahan's paper, and as this charming warbler is an object of interest to everybody, the fact of its being more generally distributed than hitherto supposed will hardly be unacceptable for record.—*A. R. Hogan; Pitton, near Salisbury, June* 11, 1860.

Occurrence of Richardson's Skua (Lestris Richardsonii) *at Eastbourne.*—A beautiful male specimen of the above rare bird, in the most perfect adult plumage, was shot at Langney Fort, Eastbourne, on Wednesday, June 6th, by a man named Ward, and which is in my possession. It is exactly in the same state of plumage as in Morris's plate, except that the legs are not "mottled." I have never seen, even in the British Museum, one in such perfect plumage, those generally that have come under my notice being birds of the first or second year; in fact, as far as my own observation has gone, the state of plumage that this bird is in is unique. Weight, 11 oz. Length, 19½ inches. Breadth from tip to tip of wings, 41 inches. Length of two middle tail-feathers beyond the others, 3 inches.—*John Dutton; South Street, Eastbourne, June* 16, 1860.

Occurrence of Richardson's Skua at Kingsbridge.—I have to inform you that on the 29th of May there was brought to me a male specimen of Richardson's skua, which was picked up dead in a field, since which, namely on the 6th of June, I received from a friend a handsome specimen of Buffon's skua, which he had just shot in company with another, which he supposed to be a female, in the Kingsbridge estuary. I find very considerable differences existing between Richardson's and Buffon's skua; the latter having the two middle tail-feathers nearly seven inches long, being nearly four inches longer than the former, the bill being shorter and slighter; the legs are shorter and of a different colour, being black above the knee, from thence to the foot light blue; the webs and toes, which are smaller than in Richardson's, are quite black; the general appearance and colour of the birds are quite different.—*H. Nicholls, jun.; Kingsbridge, June* 13, 1860.

Common Tern (Sterna hirundo) *shot during the late gale.*—I record the capture of one of those fairy-like birds, the common tern. It was shot at Kettering, Northamptonshire, on Monday, the 28th of May last, the day of one of the most violent wind storms that has visited England for upwards of forty years; in fact it could be called little short of a tornado: huge trees which braved the almost irresistible hurricane of the 28th of February were compelled to succumb; the crops of fruit which were so promising have sustained great damage.—*S. P. Saville; Jesus Terrace, Cambridge, June* 12, 1860.

Note on the Carnivorous propensities of the Blackheaded Gull (Larus ridibundus).—Two days since I visited Scoulton Mere in this county, where from three to four thousand pairs of these gulls nest every year, of which interesting and beautiful colony a full description is given in 'Yarrell's British Birds,' vol. iii. p. 434. I brought away with me a dead gull, which appeared to have been shot and to have died after reaching its home. The stomach of this specimen was found on dissection to contain the remains of two small birds, one of which was apparently a meadow pipit and the other a willow wren, both being species which nest upon the ground, and which might therefore have been pounced upon by the gull whilst sitting on their eggs. Judging from the remains of these small birds I believe them both to have been adult. I was not previously aware that these gulls destroy birds, although I knew that they frequently devour mice, and that when a corn-stack is removed from

any of the fields in the neighbourhood of their nesting-place they often make their appearance during the operation and employ themselves in capturing the mice which escape from the stack during the removal of the sheaves.—*J. H. Gurney; Catton, Norfolk, May* 30, 1860.

Deilephila lineata in the Isle of Wight.—On the 21st of May my sister had the good fortune to capture a tolerably fresh specimen of this rare insect. It was beaten out of an "Arbor-vitæ" in the pleasure-grounds of a neighbour, at Bembridge. Deilephila lineata seems to have twice come under the notice of Dr. Bromfield, as recorded in the 'Zoologist' (Zool. 803 and 1444). It is also known to have been taken in the "Undercliff," but I am not aware that it has occurred for many years past until the present capture.—*A. G. More; Bembridge, June* 2, 1860.

Occurrence of Deilephila lineata.—Three specimens have been taken at Brighton; one, a female, by a boy, on the 12th of May; one, a male, by Mr. Swaysland, on the 14th; and one I saw in the possession of Mr. Pratt, taken, I think, on the 17th. Two others were seen hovering over flowers, and one other was taken but pulled to pieces by a child between the 17th and 26th of May, all at Brighton. Another specimen, very much worn, was taken hovering over flowers on the downs, Freshwater, Isle of Wight, on the 20th of May; sex not stated.—*Frederick Bond; Cavendish Road, June* 7, 1860.

Description of the Larva of Eupithecia rectangulata.—Short, thick and stumpy. Ground colour very pale yellowish green, darker when young. Central dorsal line varying much in breadth and intensity of colouring, sometimes rusty red, sometimes dark green, frequently very indistinct, and sometimes wanting altogether. Segmental divisions reddish. Spiracular line rather darker than ground-colour. Whole body very transparent. Circulation very visible under central dorsal line. Back sprinkled with a few very short hairs. Dorsal stripe, when young, broad, distinct and rusty red. Feeds in April and May, on the blossoms of apple and wild crab. Full-fed the middle of the latter month. I took a number of these larvæ this spring in Suffolk. I noticed that those which fed upon wild crab were much brighter and darker coloured than those upon the apple blossoms in the gardens. In habits and shape this larva strongly resembles that of E. Haworthiata. The pupa is enclosed in a slight earthen cocoon. The thorax and wing-cases are yellow suffused with olive. Abdomen tapering, lower divisions and tip blood-red. The perfect insect appears in about a fortnight.—*H. Harpur Crewe; Shooter's Hill, Kent, June* 18, 1860.

Description of a Variety of the Larva of Eupithecia assimilata.—Ground-colour pinkish, back and belly tinged with green. Central dorsal line dark green, having on each of the middle segments a black dot on either side. Segmental divisions reddish. Body thickly studded with minute white tubercles, and less thickly with short whitish hairs. Head green, transparent, marked with black. I found this larva on black currant in September, 1859; and this spring, as I expected, it produced E. assimilata.—*Id.*

Description of the Larva of Eupithecia expallidata.—I have great pleasure in giving the readers of the 'Zoologist' descriptions of the different varieties of this most beautiful and hitherto almost unknown larva.

Var. 1. Ground-colour pale canary-yellow. Central dorsal line pale brown. Down the centre of the back a chain of large, deep, rich brown, tooth-shaped spots,

united at the points, and bordered on either side by an almost black subdorsal line. Dorsal spots becoming faint and confluent in the central dorsal line on the anterior and posterior segments, almost obliterated on the latter. Below the subdorsal lines a narrow rich brown line and a row of slanting stripes of the same colour. Spiracular line yellowish. Belly suffused on either side with brown, and having a central line of the same colour running the whole length. Body minutely studded with yellow tubercles and very short hairs. Has a wrinkled appearance.

Var. 2. Ground-colour grass or yellowish green. Dorsal spots brown, perfect lozenge-shaped, ceasing on the posterior segments. Subdorsal lines deeper brown than the dorsal spots, interrupted at the segmental divisions. Spiracular line yellowish, bordered on the lower side with brown.

Var. 3. Ground-colour various shades of green. All the markings, except the subdorsal lines, faint or altogether wanting.

Var. 4. Whole body, with the exception of the posterior dorsal segments, suffused with deep rich chocolate-brown. Posterior dorsal segments canary-yellow, with a central pale brown line. On every other dorsal segment two yellow spots. On each side two yellow waved lines, enclosing a brown line.

Feeds in September and throughout October, on the flowers of the golden rod (*Solidago Virgaurea*). In confinement it will eat various species of Michaelmas daisy. It has also, I believe, been beaten from the flowers of ragwort, but I have not myself met with it on anything but Solidago Virgaurea. The pupa, which is enclosed in an earthen cocoon, is large and thick, and has the thorax and abdomen yellow, the latter deeply suffused with blood-red. Wing-cases more or less tinged with green. The perfect insect appears from the middle of June to the end of July.—*Id.*

The Genus Dicranura, or the Kittens. — I have now on my setting-board all the "kittens," and have seen the old "puss," but she is not worth "boarding." There are two male specimens of D. bicuspis, gems just emerged from the pupæ; when I took them they were sitting just over the pupa-cases, on alder. Why do the French ones feed on birch? As far as my observation goes, and according to those of others also, in this country they are exclusively alder-feeders. D. bicuspis is certainly one of the handsomest moths one could wish to see. When at rest the pure creamy white, intermixed with the deep black, at once distinguishes it from D. bifida; and the sprawling, purple and black legs give it a charming appearance. I took D. bifida sitting over the pupa-case upon poplar, and D. furcula on willow, at the same time that I took D. bicuspis. — *J. B. Hodgkinson; Penwortham Mill, near Preston, June* 14, 1860.

Capture of Acronycta Alni at Holme Bush.—At Holme Bush, on the 6th instant, I captured Acronycta Alni, and another on the 12th, both females. The last taken there was five years ago.—*T. Thorncroft;* 87, *North Lane, Brighton, June* 15, 1860.

Reappearance in Profusion of Erastria venustula.—This beautiful little Tortrix-like Noctua has again appeared in Epping Forest. At first, either damaged or retarded by excessive wet, it occurred only sparingly, but the numbers gradually increased until last Sunday, the 24th of June, when they appear to have reached the zenith, one collector alone having taken about one hundred. I hope that those who have been thus successful will not forget that the cabinet of the Entomological Club, which throughout the winter is open to every applicant in quest of correct names, is yet in want of a series sufficient to illustrate the species fairly.—*Edward Newman.*

Occurrence of Ophiodes lunaris at West Wickham. — A magnificent specimen of

this previously unique insect was taken at sugar on Whit-Sunday last, by Mr. Smith, a collector living at Walworth, with whom I am not acquainted. It was brought to me to name by Mr. Clements. For the satisfaction of those who may be sceptical as to the authenticity of such a splendid capture, I may state that it was seen by a trustworthy entomologist while still alive. Only one other British specimen has been recorded, and this was said to have been taken in the New Forest by Captain Chawner. It is sometimes represented in cabinets by injured specimens of Toxocampa Pastinum.—*Edward Newman.*

Food-plant of Œcophora tripuncta: Correction of an Error.—In the 'Zoologist' for June (Zool. 7060) Mr. Parfitt announced that he had bred Œcophora tripuncta from pupæ received from Mr. D'Orville, who had found the larvæ feeding on dried mint. Immediately I perused this communication I wrote to Mr. D'Orville for some further particulars, for though Œ. minutella is common in out-houses and its larva is known to feed on dry seeds, the food and habitat here assigned to Œ. tripuncta appeared to me singular, that insect flying freely along hedges, and its proper food being, in all probability, decayed wood. Mr. D'Orville at once cleared up the mystery by assuring me the insects he had bred were Œ. minutella (oppositella, *Wood*, fig. 1575) and not Œ. tripuncta and, quoted the following entry from his journal. "February, 1857. Found, in a bundle of dried mint, hundreds of small bluish-white larvæ with light brown head; the leaves nearly all eaten. June 4th and 5th. Emerged a Micro with blackish wings, having two gold spots on each wing." Mr. D'Orville adds in his letter "The larvæ fed upon the dried leaves, and I had to keep them supplied with that food until they went into pupa. I have captured Œ. tripuncta, and have three or four specimens, whereas of the insect I bred I have many in my store box. I have written to Mr. Parfitt on the subject, and enclose his letter to me just received." Mr. Parfitt's letter unfortunately again covers the whole subject with a veil of the deepest mystery. He has bred specimens of Œ. tripuncta, but no bred specimens of Œ. minutella, and the record in his journal respecting the Œ. tripuncta states they "were bred from larvæ feeding on a bunch of dried mint; from Mr. D'Orville, Alphington." Mr. Parfitt sketches a wing of each species to show there is no transposition, and remarks that the fineness of his specimens of Œ. tripuncta is a convincing proof that they were bred. Mr. Parfitt observes, "Where the mistake is or how it can have arisen I am sure I cannot conceive, as at that time I was studying the Micros particularly, and was very careful in keeping them in separate jam pots." Strange things do sometimes happen, as for instance when I bred one Elachista Chrysodesmella from among a number of larvæ collected near Zurich, which were supposed all to be E. tetragonella, E. Chrysodesmella not being then known to occur in Switzerland! And again, Herr Mühlig, of Frankfort, has bred a single specimen of Gelechia Hübneri from amongst a number of larvæ of G. fraternella which I had sent to him from here, G. Hübneri being a species I have never taken, and the larva of it not having hitherto been observed! But to imagine that out of a number of larvæ being found by Mr. D'Orville, some of which he handed to Mr. Parfitt, the larvæ retained by Mr. D'Orville should all produce Œ. minutella and no other species, whilst those he gave to Mr. Parfitt should produce Œ. tripuncta and no other species, is far beyond the limits of probability. No doubt by some accident the pupæ were changed, though how? it is impossible to say.—*H. T. Stainton; Mountsfield, Lewisham, June* 9, 1860.

Occurrence of Badister peltatus and Anchomenus livens in Lincolnshire.—I spent a couple of days this spring in the neighbourhood of Boston, Lincolnshire, with my

old and valued correspondent Mr. Rye, hunting for Badister peltatus, which I had found there the two preceding years. On his leaving me I was joined by my friend the Rev. W. Hey, of York, and with him I spent another day in search of B. peltatus. We were rather too early to find many insects out (it being the 11th of April in a backward season), but by cutting down the banks in thin layers, and shaking tussocks of grass over an oil-cloth, we took about sixty B. peltatus between us, besides such insects as Stenolophus Skrimshiranus, Bembidium fumigatum, Stenus latifrons, S. paganus, and Cryptobium fracticorne. The next day we visited Cowbit Wash, near Spalding, almost the only undrained fen in Lincolnshire. It is a singular country, and, to any one who has never seen a fen, must have a very striking appearance. It is a wide expanse of water, diversified here and there by green fields and osier-beds, bounded only by the horizon, excepting where the Roman banks, so conspicuous in this part of England, intervene. Even in this dreary region we found inhabitants, one of whom punted us across the water, in a boat about the size of a coffin, to the neighbourhood of an osier-bed. Had our time been longer and the season a little more advanced, we might perhaps have taken Clænius holosericeus, Dromius longiceps, Trechus incilis, and other things at present only dreamed of, for everything had a very promising appearance. From an osier-bed, in old pieces of turf, and by cutting down rotten stumps, we obtained Anchomenus liveus (4), of which I took a pair a few miles from Cowbit, in September, 1858, A. piceus, A. micans, Pterostichus gracilis, Badister unipustulatus, Stenolophus Skrimshiranus, S. vespertinus, S. consputus (20), S. luridus, Bembidium æneum (abundant), and, rather strangely, Bledius tricornis many miles from salt water. A friend of mine in this neighbourhood, Mr. H. Milnes, has lately been so fortunate as to take a specimen of the very rare Amara rufocincta on the high ground above Cromford, which he very kindly presented me. Of the same insect I took a pair in Ayton quarries, near Scarborough, in July, 1858.—*Walter K. Bissill; Cromford, Derbyshire, June* 12, 1860.

Occurrence of Laccophilus variegatus in the South of England.— I am indebted to the Rev. Hamlet Clark for beautiful specimens of Laccophilus variegatus, a small hydradephagous beetle, entirely new to this country, but tolerably common over the whole of France. Fairmaire's very accurate description, which I transcribe, will enable any one to recognise the species: — "Form elongate-oval, narrowed posteriorly, rounded and depressed. Colour testaceous-red, the crown of the head, the base of the prothorax and [the middle of its anterior margin blackish: elytra covered with irregular and almost confluent black spots, giving them a brownish tint, with the external margin and two spots on each elytron of the red-brown ground-colour; the first of these spots is semicircular, transverse, and situated a little beyond the base; the second is also transverse, irregular, and situated a little behind the first, and beyond the middle of the elytron: the reflexed portion of the elytra is testaceous, inclining to red."—*Edward Newman.*

Telephorus rusticus.— Is it generally known that this insect is carnivorous? If not, it may interest Coleopterists to hear that when Telephorus lividus cannot indulge himself in probing the nectaries of the May or other flowers he can condescend to more substantial, though less ethereal diet. I spent some time this morning in watching the operations of a T. rusticus, who had found himself imprisoned on my window, and observed him feeding on the abdomen of a large fly, which had been captured by a spider, whose den was not far off, a couple of days before, and was already pretty well sucked. The Telephorus was evidently hungry, for, on finding that the spider had

left but little picking on the fly, he turned on his back, and, enfolding the abdominal section with his legs, proceeded to mandibulate (if such a word may be allowed) every crevice where moisture might possibly lurk with the utmost care. No elderly gentleman could more diligently turn and refold, and turn again his newspaper to secure every particle of news, before resigning it to some restless youngster, than did the Telephorus twist round and round his evidently much-valued prey to see if anything further could be extracted from its well-stripped segments, till at length, being convinced there was not a morsel more to be had, he suddenly flung it aside, and sprang once more upon his feet. The occurrence may not be as uncommon as I take it to be, but still it seems a pity not to notice it.—*A. R. Hogan; Pitton, near Salisbury, June* 9, 1860.

Note on Hydroptila pulchricornis and H. tineoides.—Yesterday being the finest we have had for some time I took advantage of it to hunt up the Phryganidæ, and on a wall near the river Tone were immense numbers of Hydroptila pulchricornis and H. tineoides running about with the swiftness of racers. I took out my pocket lens to examine them more closely, and indeed to be sure which species they were. I have been in doubt for some time as to whether these so-called species were really such, or only the sex of one species which now prove to be, for I had the good fortune to take a pair *in cop.* Dr. Hagen says, speaking of H. tineoides, perhaps only the female of the preceding species, meaning H. pulchricornis: but it is the reverse of this; H. pulchricornis is the female, and H. tineoides the male; his then settles this question. While busy looking at these Hydroptilas with my glass the sun was shining brightly on the wall, and in the chink of a stone were two large Epeiras; I do not know which species, as I am not versed in Arachnology. I had the curiosity of trying the burning power of a lens on a cold-blooded animal, so I just got the glass into focus upon the abdomen of the poor unfortunate spider. The moment the focal power was brought to bear the creature gave a start, precisely as if electrified. This I repeated two or three times; I did not keep the glass in focus so as to kill or injure the spider, only to try the effect. On the second application of the lens it was curious to see the action of the creature, for it put back its hind legs, and distinctly rubbed the part; it shows a degree of intelligence in directing its legs to the injured part, and we ourselves could do no more. I was much interested to see the effect of a burning point upon the nervous system of this cold blooded creature. The effect produced was equally as rapid or quick from the moment of contact as that on one of warm blood.—*Edward Parfitt; Museum, Taunton, June* 16, 1860.

Situation of Pyrgoma anglicum. — There is a slight variation in the position of this barnacle on different specimens of our British Caryophyllaceæ, but, so far as I have seen, it has always been upon, or just below, the outer margin of the calyx of the coral. I have now before me five large living specimens of Pyrgoma, which apparently spring from the level of the base of the supporting corals, but in each case the coral is very low, and a close examination shows that the barnacle is attached in its usual position close to the margin of the calyx, although at first sight it appears like a stout buttress springing from the rock, and extending some way above the corallum. Is not this the case with Mr. Guyon's specimens? There are several foreign species of Pyrgoma which affect different parts of the corals to which they adhere, but I think our single British species is pretty constant in its position at the lip of the coral. I

may mention that I have seen fourteen specimens of this barnacle attached to a single example of Caryophyllia Smithii that was dredged in Plymouth Sound, by Mr. T. H. Stewart.—*E. W. H. Holdsworth ; 26, Osnaburgh Street.*

Botanist's Corner.

British Cyclamen.—I can partially assist Mr. Clark (Zool. 6952) in his desire to determine the species of the British Cyclamen, being myself a native of Sandhurst, the Kentish locality in which the plant is found, and having for a long period taken a great interest in it. The Sandhurst Cyclamen blossoms in September, though occasionally a few flowers may come forth in August ; others of whom I have inquired confirm my own persuasion, that it has never been known in bloom at any other season. The original and only spot in Sandhurst where Cyclamens were found is (or was) a narrow strip of coppice upon a farm on the northern side of the parish, which farm was once the residence of one of the small country gentlemen formerly so numerous, but the Cyclamen wood is too far from the house to render it very probable that the plant had by some accident found its way thither from the garden. Both the white and the pink varieties grew there, and that they throve is most certain. I am not aware that any restriction was placed upon persons supplying themselves at pleasure, and the existence of the plant in that locality was very generally known. I remember to have heard, and can quite believe it to be true, that a small nursery-gardener, long in business at Sandhurst, had during his time forwarded bushels of Cyclamen roots to one of the large gardeners in the neighbourhood of London. At the Rectory we possessed the plant in great abundance, and, when in full blossom, a a bed of the two colours intermingled presented a splendid appearance. That the Cyclamens are very prolific we had plentiful evidence, and that if the ground around the beds had been left in a state of nature it would have been covered with them. That they are likewise very hardy I can testify, having myself tried them, and known them to have been tried by others, in a great variety of soils where they have always increased rapidly, when properly managed, the grand secret being to leave them perfectly undisturbed, without permitting a tool of any kind to be used in the spot devoted to them. I have no doubt that long before this time many persons, perhaps some strangers as well as natives, have been puzzled by finding Cyclamens in many places in and around Sandhurst beside that where they were originally discovered. The fact is that lest they should be extirpated from their native (?) settlement pains were taken, partly by myself, to propagate them both by plants and seeds elsewhere, and I have often, when walking or riding, carried a supply of seed-pods, which I have scattered in the woods I passed through or by. I regret that this notice will be so long before it can possibly reach Mr. Clark's eye, but I was quite unequal to preparing it at the time I wished to have done so.—*Arthur Hussey ; Rottingdean, June 16, 1860.*

Observations on Local Museums. By GEORGE MAW, Esq., F.L.S. &c.

THE formation of collections of objects relating to Natural History is so intimately connected with the subjects usually treated of in the 'Zoologist' that I am induced to think that the consideration of our local museums may come within the legitimate scope of your journal. May I be allowed a page or two to note down a few points in connection with these institutions that have presented themselves to my observation, less as expressive of any peculiar views I entertain than for the purpose of awakening others to the consideration of the subject.

I fear local museums cannot be considered as popular institutions; and furthermore, they are never self-supporting, consequently their very existence, to say nothing of their lively prosperity, depends more on accidental circumstances than their possessing any inherent powers of vitality. Where a flourishing museum exists it is not, as far as my own observations go, the necessary result of its efficiency, and if we look behind the scenes shall probably find some kind friend propping it up, either with funds or superintendence. Such help, however thankfully it should be received, is uncertain, and may be at any time removed, and the poor museum resigned to dust, dislocation and decay. How often have we seen a nice institution, built either through the assistance of some kind friend or the natural energy of a country town, well stocked with glass cases and specimens. Perhaps your M.P. patronises it for a few years, or the young surgeon takes up science and the museum to counteract the old literary medical man; may be, some two or three real lovers of Science give it more substantial support. A combination of such circumstances for a time produces an apparently flourishing museum, but in nine cases out of ten its days are numbered. These props removed, your noble institution begins to dwindle, your paid Curator is obliged to be discharged, fresh contributions of specimens are lost, or thrown dusty and uncared for in some back closet, contributors are affronted, their subscriptions fall off, and your funds only suffice to pay an occasional attendant to scrub the floor and dust the Venus in the vestibule once a month. The place is virtually closed; nobody cares for the dead lion, and accumulated debts swallow up the carcass.

Are there not several causes influencing this want of success? Firstly, the objects for which local museums should be established are, I think, rarely understood by their promoters. The exact scope of the subjects to be represented and illustrated are seldom viewed with

sufficient definition, and in the cases where an exact plan of operations is formed at the outset the functions of the museum are generally far too extended. County and district museums, it appears to me, should be rigidly limited to such objects as are found within the district, bearing in mind that your collection should be accumulated for the purpose of representing its Natural History and antiquities, also its manufactures if you wish it.

In many things the utility of an object is dependent on its absolute completeness, no measure of perfection carrying with it a corresponding measure of usefulness. This is especially true with respect to collections of objects illustrative of the Natural History of a district, and presents itself to me as a reason for limiting the scope of our museums to such dimensions as will render this state of completeness within the range of practical attainment.

There is too great a tendency in our local museums to bring together all kinds of objects, the miscellaneous character of which renders it utterly impossible for them to be arranged so as to illustrate any particular subject; and in addition to this negative utility their presence in a local museum absolutely falsifies the collection as an index to the Natural History and antiquities of a district. We have splendid national collections of comprehensive completeness, and what I would avoid in our local collections is the making of "British Museums" on a small scale all over the kingdom. I would not wish to limit too closely the subjects to be included, only that they should be of local interest and represent something. In many cases your county museums would consist solely of objects of Natural History and antiquities, whilst in some districts the collections might be profitably extended to the illustration of local arts and manufactures. I think it will be generally found that no provincial district has the means of procuring materials to form a collection of objects foreign to the locality of sufficient completeness to be either useful or interesting.

One of the causes of this miscellaneous collecting of specimens is the endeavour to make the museums look pretty and attractive. From the character of Natural History and antiquarian specimens this is but very partially attainable or desirable, as few of the objects are in themselves ornamental, and those who would be attracted merely by the pleasing aspect of a museum are scarcely worth enlisting as supporters.

Committees of management would doubtless often be perplexed in this discriminate selection of materials. It is difficult to refuse a proffered donation, and very unpalatable to be told your gift is unac-

ceptable. Mr. So-and-So, who wants to show how clever he is at bird-stuffing, will not understand why you cannot take in his pretty case of humming birds; Colonel Blazer withdraws his subscription because a place cannot be found for the Oriental arms he captured in the Punjab; and the lady from India, who offered the pickle bottle containing the snake that nearly killed her baby, is surprised that you have no interest in it. I would rigidly exclude all such "odds and ends," or at all events keep them quite distinct from your local collection. There might not be any objection to appropriating a separate room for them if you have one to spare. It should contain all the donations of worsted work and wax flowers, pretty tropical birds, monstrous lambs with two heads and chickens with four legs, Indian arrows, big foreign butterflies, Chinese gods, Egyptian mummies, bits of rock crystal, Indian scalps, sets of South Sea things, models of self-acting machinery and discoveries in perpetual motion, deformed kittens preserved in spirits, mummies of animals that have been starved to death and pretty bottles of coloured sand from the Isle of Wight.

Another point I would notice is the present state of isolation from each other of the individual museums. It is scarcely to be supposed that each independent committee of management will intuitively light on the best methods of organization. The systems of arrangement in the different museums vary very much, and it is most unlikely that they are all equally good or equally bad. Would it not be possible to organize them on some one uniform system, composed from a careful collation of the several methods now found amongst them? This could only be attained by organizing a general central committee or directorship; and there are doubtless many of our leading men of science who would undertake in their several subjects the task of collating and arranging the methods on which the various departments of the museums should be organized.

I would not wholly exclude the supervision of the existing committees of management; they would merely have to resign a part of their right to "local self-government" and work under the general central committee. It should include a President and a separate Commissioner for each branch of Natural History, Geology, Botany, Entomology, Ornithology and General Zoology; also one for Antiquities, Local Arts and Local Manufactures, and under these the local committees would work on some uniform approved system.

The "constitution" of this general governing power would be a very

delicate question, as the numberless little cliques and parties into which naturalists are unfortunately split up would doubtless stand in the way of a connected organization. Almost every branch of Natural History has a central Society in London, and it appears to me that if they would each undertake the supervision of their several subjects in our county museums that the appointment of the "Commissioners" I propose could not be in better hands. The Linnean, Geological, Entomological and Antiquarian Societies, and the Society of Arts, might unite for this object.

Government superintendence appears to me another practicable method for the accomplishment of the desired object. The subject would not be popularly considered of the same importance as Schools of Art, but as it is to a certain extent related to Education, might be brought within the scope of Government interference. Supposing the local funds now spent on our county museums were kept available, a very trifling extra public expenditure might be the means of placing our local museums on a much better footing than that which they at present occupy. If, as in the case of our national schools, public grants were made to the museums conditionally on their submission to the supervision of the "Inspectors" or "Commissioners," I believe nearly all of them would be placed within the range of the proposed organization.

Another source of weakness to our county museums is the tendency towards the formation of private collections. Excepting where these are formed for a definite object, as accessories to the study of a given subject (and how often are they made without aim or intention), the expense to private people of bringing together Natural History specimens is, to say the best of it, much wasted, and the sources of supply of specimens for public museums exhausted. To counteract this I would propose that our public museums should be organized so as to be the custodians of specimens belonging to private people in addition to possessing specimens, by which means I think a vast number of objects would be brought within the range of a useful organization which would otherwise lie as useless *disjecta membra* in private cabinets.

I make these few suggestions in the hope that some one will take up the question in a more definite form and detail. At present I fear it must be admitted that our county town museums, with some few exceptions, are melancholy specimens of neglect and want of organization, and should, I think, enlist the careful consideration of all who

have the progress of Natural History at heart, and who believe that our local museums ought to be a useful element in the progress of Science.

GEORGE MAW.

On the Great Rorqual of the Indian Ocean, with Notices of other Cetals, and of the Syrenia or Marine Pachyderms. By EDWARD BLYTH, Esq., F.L.S., &c.

THE gigantic whales of the intertropical regions of the ocean have been little studied. The existence of them is even ignored by Dr. J. E. Gray, in his elaborate Synopsis of the known species of Cetacea, published in the 'Zoology of the Voyage of H.M.S. Erebus and Terror,' published in 1846, and again in the 'Proceedings of the Zoological Society' for 1847; but there happens to be a very early notice of them at the northern extremity of the Arabian Sea, in the narrative of the famous voyage of Nearchus, the Commander of Alexander's fleet which sailed from the Indus to the Persian Gulf, B.C. 327. Not only did the ancient navigator encounter a troop of these huge animals, but it would appear that they were at that time not unfrequently stranded on the coast of Mekran, where the Ichthyophagi of that woodless region used their bones for building purposes, as stated in the following passages.

"The generality of the people live in cabins, small and stifling: the better sort only have houses constructed with the bones of whales; for whales are frequently thrown up on the coast, and when the flesh is rotted off they take the bones, making planks and doors of such as are flat, and beams or rafters of the ribs or jaw bones; and many of these monsters are found fifty yards in length. Strabo confirms this report of Arrian; and adds, that the vertebræ or socket-bones of the back are formed into mortars, in which they pound their fish, and mix it up into a paste, with the addition of a little meal."*

Again, "Nearchus says that on the morning he was off Kyiza or Guttar they were surprised by observing the sea thrown up to a great height in the air, as if it were carried up by a whirlwind. The people were alarmed, and inquired of their pilot what might be the cause of the phenomenon; he informed them that it proceeded from the blowing of the whale, and that it was the practice of the creature as he

* Vincent's 'Voyage of Nearchus,' p. 267.

sported in the sea. His report by no means quieted their alarm; they stopped rowing from astonishment, and the oars fell from their hands. Nearchus encouraged them, and recalled them to their duty, ordering the heads of the vessels to be pointed at the several creatures as they approached, and to attack them as they would the vessel of an enemy in battle. The fleet immediately formed as if going to engage, and advanced by a signal given, when shouting altogether, and dashing the water with their oars, with the trumpets sounding at the same time, they had the satisfaction to see the enemy give way; for, upon the approach of the vessels, the monsters ahead sunk before them, and rose again astern, where they continued their blowing, without exciting any further alarm. All the credit of the victory fell to the share of Nearchus, and the acclamations of the people expressed their acknowledgment both of his judgment and fortitude employed in their unexpected delivery."*

"The simplicity of this narrative," continues Mr. Vincent, "bespeaks its truth; the circumstances being such as would naturally occur to men who had seen animals of this magnitude for the first time; and the better knowledge our navigators are possessed of, who hunt the whale in his polar retreats, shows that he is sometimes as dangerous an enemy as he appeared to the followers of Nearchus."

It is somewhat remarkable, however, that I have been unable to discover a single record, from the days of Nearchus to the present time, of the occurrence of great whales in the Indian seas north of the Equator, with the exceptions only of one huge fellow, described to have been 90 feet in length and 42 feet in diameter, which was stranded upon the Chittagong coast in 1842; another of 84 feet in length, which was stranded upon an islet south of Ramri and east of Cheduba on the Arakan Coast in 1851 (as noticed by myself in the Asiatic Society's 'Journal,' vol. xxi. p. 358 and vol. xxii. p. 414); and to these two notices may be added the statement in the Rev. F. Mason's work on the 'Natural History of the Tenasserim Provinces,' that "The whale is found south of Mergui, and Capt. Lloyd named a bay a few miles south of the parallel of 12° North, 'Whale Bay,' from the circumstance he says, 'of its being resorted to by numerous whales, and its being the only part of the coast where I have seen them.'"†

* Vincent's 'Voyage of Nearchus,' p. 269.

† I have since obtained information of one of the largest size which was stranded near Karáchi some years ago, and also of two during the present year (1859) in Ceylon, one near Galle, the other near Trincomali. Referring to Dr. Kelaart's 'Prodromus Faunæ Zeylonicæ,' published in 1852, we find it there stated that "Whales are very

They are, nevertheless, so far from being rare, indeed the sight of a shoal of these huge animals is so familiar a spectacle to mariners, that to this very circumstance—combined with the fact of their being of little commercial value—may be attributed the extraordinary absence of such memorial. Had the appearance of a shoal of enormous whales in the Arabian Sea or Bay of Bengal been a phenomenon of unusual occurrence, it would unquestionably have been recorded from time to time.

From reliable information which I have obtained I am enabled to state with confidence that they are still occasionally observed within the Persian Gulf, rarely however in shoals, but generally one or two stragglers at a time. It may be concluded, therefore, that a shoal of them may yet be now and then seen off the coast of Mekran, at the head of the Arabian Sea, a little further to the East, where Nearchus and his fleet encountered them; and that a carcass may still occasionally be stranded on the same rarely-visited coast, and the bones even yet be applied to like purposes by the scanty fish-eating population of that inhospitable woodless region.

It appears, from much inquiry I have made on the subject of competent observers that only one species of whale is met with in these seas, and all accounts agree that it is a "finner," "fin-back," "razor-back," "pike-whale" or rorqual (*Balænoptera*) of enormous size. I cannot learn that a "hunch-back" (*Megaptera*) has been observed north of the Equator. An observant nautical friend writes word that "the whale most generally seen in and about the Bay of Bengal, often in numerous

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rarely seen. A dead one is occasionally stranded. The skeleton of one cast ashore, some twenty years since, at Mount Lavinia, is still in the Museum at Colombo." Sir J. Emerson Tennent, in his recent work on Ceylon, mentions their being frequently captured within sight of Colombo. Since the above was written, I have received a letter from the Rev. H. Baker, jun., of Alipi, St. Malabar, in which that attentive observer states, "Whales are very common on the Coast. American ships, and occasionally a Swedish one, call at Cochin for stores during their cruises for them; but no English whalers ever come here that I have heard of. One said to be 100 feet long was stranded on the coast. I saw some of the vertebræ and ribs about three years ago. Last year another, 90 feet long, got among the reefs at Quilon, and was murdered by some hundreds of natives with guns, spears, axes, &c., and was cut up and eaten (salted and dried as well as fresh). The Roman Catholic fishermen of the coast pronounced it 'first chop beef.' The Maldives and Seychelles are said to be the head-quarters of the whalers who seek for these whales. I am sorry I never noticed the jaw-bones sufficiently, for I saw them on the beach. We have the dugong on the coast, and porpoises come up the back waters in March when they are salt, but the susu I do not think is known here."

herds, exhibits the dorsal fin; at least," he adds, "all that have come under my observation, and if my memory serves me correctly, the dorsal fin is about one-third or a little more from the head, and is well developed." To cite further communications of the kind would be mere repetition.

No other Balænidæ attain the dimensions of the largest rorquals, including the known examples stranded within the Bay of Bengal; and the peaked dorsal fin is of itself a distinction. Moreover, the finless or right whales are restricted to cold latitudes, where only, it would seem, they can obtain a sufficiency of their peculiar food, the rorquals subsisting mainly on Cephalopoda. According to Scoresby, the great Northern or Greenland whale (*Balæna mysticetus*) "has never been seen beyond the limits of the Arctic Ocean." Another descends more southward in the comparatively cold oceanic region of the Northern Pacific. In the southern hemisphere there would also appear to be two species recognised as such by seamen with whom I have conversed, Balæna australis of Desmoulins and B. antarctica of Gray. In the Timor seas, black whales in addition to sperm are stated to exist in considerable numbers; but those black whales I have been assured are "hunch-backs," which are much more nearly akin to the "finners" or rorquals, though I suspect them to be a small kind of cachelot subsequently noticed under the name of Euphysetes Graii.

The locality known as Wal-visch (*i. e.* whale-fish) Bay, latterly spelt Walwich, on the East coast of South Africa, is considerably within the southern tropic; but the name may well refer to cachelots or sperm whales. In a short account of Timor, published in Moor's 'Notes on the Indian Archipelago,' we read that the coast people of the island of Selvi (one of the Timor group) "are such expert fishermen that they constantly take the species of whale called black-fish, which are often 20 feet long, and which afford oil inferior only to the spermaceti, having the same substance in the head as the spermaceti whale. They do not boil the blubber, but expose it to the sun in an inclined situation with a ditch at the bottom, into which the oil drains." A small species of the Physeter group must be here intended; but the black-fish of the Bay of Bengal is my Globicephalus indicus. As for the sperm-whale fishery in the Eastern Seas, the Sulu or Mindoro Sea between Borneo and the Philippines, in from 50° to 100° East latitude, is at present I believe the grand resort of the whalers.

Sperm whales were formerly hunted off the shores of the Antilles. Thus, the excellent observer, Mr. Richard Hill, of Spanish Town, Jamaica, writes to his friend, Mr. P. H. Gosse, that "Moreau de St.

Meri, in his 'History and Description of the old French Colony of St. Domingo,' relates that in his time (1785), in the months of March, April and May, as many as five-and-twenty vessels from the North American States could be seen on the coast off Sale Trou, near Jacmel, fishing for cachelot whales, and, he adds, for souffleurs (*Balænoptera*); and that this fishery was with equal spirit pursued within the gulf to the west of the colony; that is, within the bight, in which I saw the cachelot breach. The whale-fishers resorted to Turk's Island to boil their oil.*

Balæna msyticetus is generally believed to be the largest of the true Balænæ, and it rarely attains to 70 feet long, according to a very high authority, the late Rev. Capt. Scoresby; but Mr. Polack, whose work on New Zealand contains much original matter concerning the great cetals of the Southern Ocean, states that B. antarctica "not unfrequently attains the length of 70 feet, and the breadth where the flipper is placed (which is the thickest part) is often 18 feet. The female is invariably the larger." B. australis is stated rarely to exceed fifty feet in length. Again, the head in Balæna approaches to one-third of the entire length, while in the "finners" and "hunch-backs" it constitutes about a fourth. Lastly, the configuration of the chief bones of the "flipper" or limb, is very different in the Balænæ to what is seen in the others, as shown by Cuvier's figures in the 'Ossemens Fossiles.' These various considerations enable me to pronounce with confidence on the genus of the two great individuals which have been stranded, of late years, on the eastern shores of the Bay of Bengal.

The following notice of the 90-foot specimen (as alleged) that was cast upon the Chittagong coast in 1842 (in about lat. 21° North.), is taken from a letter that appeared in the 'Friend of India' newspaper for September 15th of that year. It appears that "early on the morning of the 15th of August, the attention of the people of Cox's Bazaar and those of Muskal Island were attracted by something in appearance like a capsized hull of a large vessel floating on the surface of the sea, coming towards the mouth of the Muskal river, and when it approached near the land they perceived that it was a living creature, by its continually spouting up water into the air; and by the middle of the day it cast itself on the shore of the west side of Muskal Island. By the assistance of the flood and the surf of the sea it was brought completely on shore, where, as soon as it was landed, it appeared to be in great distress, for it roared very loudly, similar to the roar of an

* 'A Naturalist's Sojourn in Jamaica,' p. 353.

old elephant. As soon as all the Mugh inhabitants, both of Cox's Bazaar and Muskal Island, heard of the circumstance, they all sallied to the spot, and found that it was a large whale. They then measured it, and found it to be 60 cubits (equal to 90 feet) long and 28 cubits (equal to 42 feet) in circumference. They then cut up the animal, and each one helped himself to a large portion of the blubber, from which a quantity of oil was extracted. Two flakes of its gill [? flakes of baleen] were brought to me," remarks the writer, "which are indeed a great curiosity." The foregoing details were obtained from a Mugh Christian, who is not likely to have remarked the presence of a "back-fin."

The other recorded example, stated to have been 84 feet in length, was thrown up dead upon Juggu or Amherst Islet, about 2° further south, during the rainy season of 1851. A few of the bones were collected in the following year by the present Major T. P. Sparkes, then Assistant Commissioner of Ramri, and were presented by him to the Society's museum. They consist of the two rami of the lower jaw, a right rib (probably the third of the series), the left radius, and five vertebræ. The proportional length of the radius indicates the animal to have been a Balænoptera or rorqual, while the remarkable slenderness of the lower jaw suffices to prove it a distinct species from any hitherto described rorqual.

The only whale, indeed, that I can find to bear comparison with it is one described in the 'Philosophical Transactions' (vol. i. p. 11) as cited by Dr. Gray, who refers it to his Megaptera americana, founded upon the tracing of a drawing of a species stated to be common off the Bermudas (an almost subtropical locality). That whale is thus described: —"Length of adult 88 feet; the pectoral 26 feet (rather less than one-third of the entire length); and the tail 23 feet broad," &c. From the medium length of the radius of the Indian animal the species must be very different; in fact, a Balænoptera as distinguished from a typical Megaptera or "hunch-back."

But the lower jaw is remarkably slender for a Balænoptera, even more so than in Balæna mysticetus, as viewed laterally, while the coronoid process is well developed, as in Gray's figure of the lower jaw of Balænoptera rostrata; the base of the jaw, however, posterior to the process is not deeper, as in that figure, but the reverse, and the jaw is proportionally much longer anterior to the process. The entire length of each ramus is within less than 2 inches of 21 feet, showing the head to have been about a fourth of the total length. Vertical diameter, 3 feet in advance of summit of coronoid, 18 inches (measured

by callipers); at 3 feet from tip, 13½ inches; and where most contracted posterior to the coronoid, 15 inches only; extreme depth, at coronoid process (inclusively), 26¾ inches. From middle of coronoid to summit of condyle posteriorly, in a direct line, 37½ inches. The shaft of the ramus is more approximatively of the same thickness throughout than in Balæna mysticetus, tapering quite evenly.

The radius is 38¾ inches long, nearly similar in shape to, but is more curved than, that of Megaptera poeskop. The shape of this bone in Balæna (as figured by Cuvier) is remarkably different.

The rib is proportionally small, measuring only 8 feet 2 inches round its curvature to superior articulation. It is probably the third of the series, on the right side.

Of the five vertebræ two are dorsal about the 6th and 7th; but they have been much hacked and are mutilated of their processes. Body of the vertebra (hind surface) 11½ inches deep by 15 inches broad. A lumbar vertebra, probably the first, has the body (measured posteriorly) 13½ by 16½ inches broad; antero-posterior diameter, 14 inches; spinal apophysis 27 inches or a trifle more, allowing for the extreme tip which is broken off) measured from the front, and sloping backward at an angle of nearly 45°.* Another lumbar vertebra, probably the 3th or 6th, with spinal apophysis 8 inches in antero-posterior diameter, and lateral processes 12 inches long and 8½ inches broad. Lastly, a caudal (?) vertebra (I mean one of the series with inferior V-bones attached; not one of the small caudal that support the tail-flukes) about the 4th; the body (posteriorly) 15 by 17½ inches broad.

In the 'Asiatic Researches,' vol. xv. Appendix, p. 34, "a large jaw-bone of a whale" is recorded as having been presented by Mr. J. Kyd. It was only the basal portion of one, and is now much injured by long exposnre to the weather out-of-doors; but it appears to have belonged to a rather smaller individual of the same species, which I think we may safely venture on designating Balænoptera indica.

In 'Asiatic Researches,' vol. xvii. p. 624, "the vertebræ and cranium of a whale" are recorded as presented by G. Swinton, Esq. These are are now much damaged, and mostly valueless, from long exposure to all weathers—the result of want of accommodation for such bulky specicimens in our excessively over-crowded museum building. The length of this whale was about 30 feet, of which the head was about a fourth.

* In the figure of the skeleton of the great northern rorqual in the volume on Cetacea in Jardine's 'Naturalist's Library,' pl. 5., the apophyses of the dorsal vertebræ are represented to slope forwards!

Probably the young of Balænoptera indica, rather than another and smaller species. A fine skull of the same, with rami of the lower jaw measuring 10 feet, was obtained by the late Professor H. Walker from a friend in Arakan, and is now in the museum of the Calcutta Medical College. It is most probably from the Bay of Bengal. In the Society's 30-foot specimen the bases of the lower jaw are mutilated, only the shafts remaining; but in the Medical College skull the coronoid, &c., of the lower jaw accord with those of our 21-foot jaw.

There are other remains of Balænidæ in our museum, the origin of which I have been unable to trace, at least when and by whom presented; but they were in the collection prior to my taking charge of it in 1841. Portions of one skeleton appear to be referable to Balæna australis of Desmoulins, le Grand Balein du Cap of Cuvier, or ordinary southern right whale. These consist of three vertebræ, a pair of humeri and a pair of scapulæ. One humerus and one scapula have now been injured by long exposure out of doors; but the others are in tolerably good preservation, and well agree with Cuvier's figures in the 'Ossemens Fossiles;' the acromion being present only in the injured scapula. The scapula measures 41 inches long by 47½ inches in the extreme breadth. The humerus 22 inches long by 15 maximum and 9½ inches minimum breadth. Of the vertebræ, one is worked into a fancy chair, and is an uninjured first dorsal; body 8½ by 10¾ inches broad, measured posteriorly; the lateral processes 12 inches long. Another is probably the third dorsal; and the remaining one is probably the 5th dorsal, 13½ by 14 inches posteriorly, and 12 inches in antero-posterior diameter; the spinal apophyses of both are broken away above their alæ. It will be understood that I merely adjudge these to be portions of the same skeleton.

Of two pairs of the internal ear of "the whale," one pair is likely to belong to the last-noticed individual, the other pair perhaps to the 30-foot Balænoptera, which, however, is less probable, judging from their great size. It is not likely that they appertain to the same species, as one pair is nearly equal in size, while in the other the left is much larger than the right. From this great inequality I am inclined to suspect that the latter pair belong to a cachelot or sperm whale. A large left internal ear, without a right to match it, is probably that noticed in the 'Journal of the Asiatic Society,' vol. v. p. 374, as having been presented by the late James Prinsep; and there is even another left cochlea only. On present data I cannot venture on attempting to identify the precise species or even genera to which these specimens belong.

The cachelots or sperm whales (*Catodontidæ* of Dr. Gray), I humbly consider to constitute a subfamily rather of Delphinidæ, especially since the discovery of that very remarkable small species, the Euphysetes Graii of Mr. W. S. Wall, Curator of the Australian Museum at Sydney. That gentleman well argues the matter, in his 'History and Description of a New Sperm Whale,' &c., of which he favoured me with a copy. Unless the ear-bones before referred to belong to this group we have only five teeth of a sperm whale. By whom presented I have been unable to discover.

Mr. Polack has a curious statement regarding the sperm whale, to which I invite attention. He says, "The cachelot is covered with an outer cuticle, as transparent as gold-beater's skin, beneath which it is covered with hair perfectly sleek and black, covered with an uliginous matter, the texture and length resembling the clothing of the seal tribe."

Of ordinary Delphinidæ, one of the most common species in the Bay of Bengal is that generally known as the black-fish to seamen, and named by me Globicephalus indicus in the 'Journal of the Asiatic Society,' vol. xxi. p. 358. This was first noticed in vol. xix. p. 426; a large herd or "school" (*i. e.* shoal) of these animals having been carried into the salt-water lake east of Calcutta during the month of July, 1852. It is remarkable that two specimens which I have since obtained were procured during the same season of the same year, *viz.*, one taken in the Hugli near Serampore, 6½ feet long, in 1858, and a newly-born young one during the year 1859, which was brought to the Calcutta fish bazaar. The species is well distinguished from G. Deductor of the Atlantic, of which we have a fine skull of an old animal for comparison. The inter-maxillaries of the Indian species are shorter and one-fourth broader, and the teeth are considerably stouter. Colour of the animal, uniform leaden-black, slightly paler underneath. Length of an adult male 14 feet, 2 inches; the flippers 2 feet long, and 6 inches in greatest breadth. Length of dorsal fin, 2¼ feet, and height 11 inches. Breadth of tail-flukes 3 feet; and from vent to cleft of tail, 4 feet 10 inches. Adult female rather smaller. The skeleton of a female set up in our museum has a series of 49 vertebræ, additional to the united cervical. There are 11 dorsal or costal, 12 lumbar without the articulated V-bones, 16 with the latter, and 10 small caudal within the tail-flukes. We possess skeletons of the adult male and female, the latter set up; the 6½-foot example mounted as a stuffed specimen; and the new born young one as a skeleton. There is also a skull of this species in the Museum of the Calcutta Medical College.

I had much trouble in securing our two skeletons of this fine cetal. The animals were floundering about in all directions in the shallow water, and groaning painfully (*vide* 'Journal of the Asiatic Society,' vol. xix. p. 426). From what I afterwards learned, there must originally have been several dozens of them, which the natives towed off into the river as they died, having no notion of extracting oil from their carcases. The weather was terrifically hot; but I succeeded the first day in securing two pairs of the largest, male and female, and had them safely tied up towards evening for operations on the day following. They were all cut adrift during the night; and the work had to be begun again; and I considered myself fortunate in succeeding so well as I did in obtaining two perfect skeletons for the Society's Museum.

There is a Globicephalus also in the China seas, of which a description, with details of its anatomy, is published in the 'Chinese Repository' for January, 1833, p. 411. The specimen (a male) was taken near Leu-chen; and, though designated G. Rissii by its describer, is probably a distinct species. Colour black above, lighter on the belly. Length $9\frac{3}{4}$ feet. "Head 18 inches long, and average circumference 3 feet. There were only five blunt and eroded teeth in the lower jaw. The dorsal fin was triangular and almost immoveable, 15 inches long; pectorals 14 inches; and all remarkable for their firmness and strength." "This species does not spout a jet, though their breathing is distinctly heard at a short distance. They swim near the surface; and we had several opportunities of observing their habits during the voyage. The sailors term them cow-fish."

Another small cetal of which we possess a stuffed specimen is that described as Delphinus perniger, *Elliott* (Journal of the Asiatic Society, vol. xvii. 250), from the Bay of Bengal; the species distinct from any of those described by Dr. Gray, and having the teeth proportionally large.

Of other cetaceous remains we have the Narwhal tusk presented by Mr. Lumsden (Asiatic Researches, vol. xiv. Appendix), the skulls recorded in the 'Journal of the Asiatic Society,' vol. viii, p. 969, from Greenland, and the two skeletons from Norway (Journal of the Asiatic Society, vol. xv.; Proc. vol. ix). Also two skulls of Steno rostratus of Cuvier; one of an animal taken near the Nicobar Islands, the other from the Red Sea, and a skull which seems to be that of S. attenuatus of Gray (Zoology of the Voyage of H.M.S. Erebus and Terror, Cetacea, pl. 28), being probably that mentioned of "a dolphin found near the Isle of France," (Asiatic Researches, vol. xii.; Appendix, vol. xxiv). Lower jaw 14 inches. Teeth $\frac{4}{4}\frac{1}{1}$. Another lower jaw,

"from the high seas," with series of 38 teeth, presented by Mr. C. Hervey (Journal of the Asiatic Society, vol. x. p. 937), and two skulls, toothless, and wanting the lower jaw, with series of 39 tooth-sockets. Length 15 and 15½ inches. Origin unknown, but presented by myself. All of these would appear to be the same, but the left ramus of a lower jaw, with series of 43 teeth, is vertically much deeper at the symphisis, and therefore undoubtedly appertains to a distinct species.

Also a skull according with Delphinus Eurynome of Gray, and another with D. obscurus of Gray, which, together with the Red Sea example of Steno rostratus, were made over to the Society's Museum from that of the Calcutta Medical College in 1843. Lastly, the skull of a dolphin affined to D. Delphis of Linneus, and "procured during the voyage from England to India." It was presented by the late Mr. R. W. G. Frith, and is probably an undescribed species. With a general resemblance to that of D. Delphis the intermaxillaries, united as far as the middle of the rostrum, are vaulted, so that the section of the united middle portion forms a complete semi-circle, rising abruptly from their maxillaries, and being there only as broad as the exposed portion of each maxillary; probably a distinctive specific character. Teeth $\frac{52}{50}$—$\frac{55}{50}$. If confirmed as a new species, I propose calling it Deilephila Frithii.*

Of the Gangetic susu (*Platanista gangetica*) we have a stuffed male, presented by M. Alfred Duvaucel, a stuffed female, and also a stuffed example of a young female procured by myself. With skulls of adult male and female, the former toothless, and presented by Dr. Wallich. The entire skeleton I have long been trying to obtain. There is a fine series of skeletons of this species in the Museum of the Calcutta Medical College.

Though abounding in the River Hugli the susu is extremely difficult to procure, at least in the vicinity of Calcutta; and too often when a fine example is taken the captors saw off the rostrum, rendering it useless for a museum specimen. In what I believe to be the adult

* Since the above was written Capt. Jethro Fairweather, commanding the ship 'Forfarshire,' has favoured us with the skull of a small but not young Steno, which seems to be S. attenuatus of Gray. It was procured not far from the Sandheads, out of an innumerable herd of them, "as far as the eye could reach in all directions," and was of a paleish lead-colour; not therefore, however, the Delphinus malayanus var. plumbeus, which is a much larger species common in the Bay. Teeth $\frac{39}{41}$—$\frac{49}{43}$. Major R. C. Tytler, also, has presented a skull taken west of the Cape of Good Hope, which agrees, or very nearly so, with the two heads minus the teeth and the lower jaw, mentioned in the text.

male, the symphisis of the lower jaw measures 17 inches; in the adult female only 12 inches; the rostrum being thus 5 inches longer in the former.

The susu ascends very high up the rivers, if not quite to the foot of the mountains. Hardwicke's drawing was "made from a living specimen 1000 miles above Calcutta." Major Tytler assures me that he has seen them about 40 miles up the Jumna, and also at Raj-ghât Mundi in the Dehra Dhoon; likewise in the Indus and Sutlej near Ludiána; but these were doubtless of the species proper to the Indus and its tributaries. The Gangetic susu is common throughout the valley of Asám, in the Brahmaputra and its tributaries. Whether inhabiting the Irawádi and other Burmese waters I am unaware; but have been assured that no such animals exists there. From the minuteness of its eyes this creature is obviously adapted for turbid rather than for clear water; and it has never been observed out at sea. It is migratory, as it occurs towards the Gangetic outlets only in the cold season, as remarked by Dr. Cantor; but at what particular season it is observed in the Upper Provinces I have been unable to ascertain.

The skull of a susu from the Indus, presented by the late Sir Alexander Burnes, is of a conspicuously distinct species which I designate Platanista indi, of Blyth. Maxillary crests wanting in the specimen. Larger and much more robust than P. gangetica, with the same number of teeth, which are more than twice as stout as in the other, being much ground down by attrition in the specimen. Length of skull $20\frac{1}{4}$ inches; greatest width at zygomata $9\frac{1}{4}$ inches; depth of the two jaws, with teeth *in situ*, measured in the middle of their length $3\frac{1}{4}$ inches, in P. gangetica barely $1\frac{3}{4}$ inches. Length of symphysis of lower jaw 11 inches. Depth of zygomatic arch $2\frac{3}{8}$ inches.

A coloured figure of probably the identical individual that furnished the skull above described occurs among the Burnes' drawings. The rostrum is represented as short in proportion to the length of the animal, and the neck to be more contracted than in the Gangetic species, which may be an error of the draughtsman. Colour also much paler; the lower parts dull albescent, abruptly defined in a line from the gape to the tail-flukes. The specimen is evidently a female; whence the male should have a longer rostrum. The dimensions assigned are "7 feet long by 1 foot 3 inches deep.' Rudimentary dorsal fin as in the Gangetic species. Further information respecting the susu of the Indus and its tributaries is very desirable.*

* The existence of the susu of the Indus, as a particular species, is referred to in Professor Reinhardt's admirable paper on the Gangetic species, a translation of which

Of the Syrenia, or Gravigrada of De Blainville, the Cetacea herbivora of the Cuviers (which Professors De Blainville and Owen have shown most satisfactorily to be much more nearly akin to the quadrupedal Pachyderms*), we have only the genus Halicore or duyong. The skull and the lumbar and caudal portion of the vertebral column of an adult I made out long ago to pertain to H. australis of Owen, the Australian duyong as distinguished from that of the Indian Seas, or H. indicus of F. Cuvier; but how we came by an Australian specimen was an enigma only very recently solved. In Corbyn's 'India Review,' vol. iii. p. 46, there is a memoir of the late Dr. Robert Tytler, of the Bengal Medical Establishment; and in this memoir we read that "During his various expeditions Dr. Tytler made some valuable collections of natural curiosities, of which he largely and liberally contributed to the Asiatic Society of Calcutta. In 1827 he read a paper on the duyong or dayoung. The bones of four different individuals were picked up by Dr. Tytler at Raffles Bay, on the north coast of New Holland. In one instance they were sufficiently numerous to form nearly an entire skeleton of the animal. This creature is not uncommon in the Eastern Archipelago, but its existence on the coast of New Holland was made known for the first time by Dr. Tytler." Hence, obviously, our bones of Halicore australis.

The existence of a duyong on the Australian coast was recognised so long ago as by Peron, in his account of the 'Voyage of Discovery to Australia,' made by the corvettes "Geographie," "Naturaliste," and goelette "Casuarina," in 1800—4, edited by M. Francis Peron, naturalist to the expedition, and published in 1807. Dampier mistook them for hippopotami; but he only saw a head, "half decomposed by digestion," and the tusks doubtless helped to mislead him, for little in his time was known of hippopotami beyond their tusks, our accurate acquaintance with this animal being still quite recent.

Peron only saw a few teeth; but he mentions one of these animals which "lay extended on the beach of 20 to 22 decimetres [6½ to 7 feet English] in length, already half-decomposed by putrefaction, and which appeared to our sailors," he adds, "so different from the Phocæ that they thought they ought to bring its remains to me. Unable to bring the entire head, on account of the extreme stench which it exhaled,

(by the late Dr. Wallich) appears in the 'Annals and Magazine of Natural History' for 1852, pp. 162, 279, and *vide* p. 291. An excellent figure of the animal accompanies that paper.

* *Vide* 'Proceedings of the Zoological Society' for 1838, p. 45, &c.

they tore from it seven teeth, which they offered me. It was easy for me to discover that these teeth belonged to a herbivorous animal. They proved, in fact, to be the teeth of a dugon, a mammiferous sea-animal but little known, and which appears to be confined to the Indian Ocean." He then cites Leguat's account; but this worthy writer observed them at the Mascarine Islands (Mauritius, Rodriguez, &c.), where they are now, so far as I can learn, quite extinct, and the species may have been different, perhaps that from the Red Sea, styled H. Tabernaculi by Dr. Rüppell; it may, however, still be found off Madagascar and the neighbouring coast of Africa.

Leguat, with his party of French Protestant refugees, settled on the then uninhabited island of Rodriguez in 1691, and remained there for two years. His account is celebrated for the description of the now extinct solitaire, and his accuracy in other matters has been established. He mentions duyongs as inhabiting the shores of the Mascarine Islands "in great numbers. They attained to 20 feet in length, and fed in flocks like sheep in three or four fathoms water, making no attempt at escape when approached. Sometimes they were shot at the end of the musket, sometimes laid hold of and forced on shore. Three or four hundred were met with together, and they were so far from shy that they suffered themselves to be handled, and the fattest were thus selected. The larger ones were avoided, not only on account of the trouble they gave in the capture, but because their flesh was not so good as that of the smaller and younger ones." *

The H. Tabernaculi of the Red Sea Dr. Rüppell "saw swimming among the coral banks on the Abyssinian coast near the Dalac Islands. The fishermen harpooned a female, which he dissected, 10 feet long. The Arabs stated that they live in pairs or small families, that they have feeble voices, feed on Algæ, and that in February and March bloody battles take place between the males, which attain to 18 feet," &c.†

Sir Stamford Raffles remarks that "the duyongs are seldom caught at Singapore above 8 or 9 feet in length; but how much larger they grow is not ascertained, as, when they exceed that size, their superior strength enables them to make their escape."

Barchemitz remarks of those of Australia that "Each of these enormous fish is more than 21 feet long; the male is a little larger than the female. Their heads resemble that of an ox. They live upon a green grass which grows upon the banks."

Some of the sailors of the expedition that Peron accompanied were

* Penny Cyclopædia,' article "Whales." † Id.

once "alarmed by a terrific howling which resembled the roaring of a bull, but much stronger, which seemed to come from the neighbouring reeds." This was near the Swan River; and it may be remarked that Mr. Fraser, in his description of the Swan River, when it was surveyed by Capt. Stirling in 1826, notices that "while attending to a boat on the river I distinctly heard the bellowing of some huge animal similar to that of an ox, from an extensive marsh further up the river." Peron justly remarks that "this terrific roar could only belong to one of those great animals which the Indian Ocean nourishes within its seas; but of all those with which we are acquainted the dugon alone presents analogous dimensions to the terrific noise which it makes." Now the Arabs described to Dr. Rüppell that the duyong of the Red Sea had a feeble voice!

The Australian duyong is met with on the north coast of that island-continent, within the great barrier reef, at Swan River on the western side, and at Moreton Bay on the eastern. It certainly appears to be a distinct species from that of the Malayan Seas; but additional species to these two are less satisfactorily established, and the total disappearance of these animals from the vicinity of the Mascarine Islands is worthy of attention, and may be borne in mind with reference to the extraordinary fact of the seeming extinction of the Rytinus Stelleri in the North Pacific. We want information, however, respecting duyongs at the various coral groups of the Indian Ocean, within ten or twelve degrees of the Equator. The same species may well inhabit the whole of them. It is remarkable that the Malays consider that two species of these animals exist.*

I am not aware that it is yet generally known to zoologists that the H. australis differs conspicuously in external colouring from H. indicus, but such appears to be the fact from the following notice:—

"In Moreton Bay and on the neighbouring coast the aborigines eagerly pursue the duyong, a species of small whale, generally known to the colonists as the 'sea-pig.' This animal has a thick smooth skin, with a few hairs scattered over its surface. Its colour is bluish on the back, with a white breast and belly.† In size the full-grown

* *Vide* 'Proceedings of the Zoological Society' for 1838, note to p. 43.

† M. F. Cuvier figures the Malayan duyong of an uniform pale slaty or plumbeous colour, with some darker blotches on the sides. In the atlas to the 'Voyage of the Astrolabe' the duyong is figured of a pale fulvous hue with white under parts, which laterally are blotched with the colour of the back. Hardwicke figures it of an uniform slaty black, albescent on the head (unless this be meant for shine or reflected light). There is a wood-cut showing the mode in which the female carries her young in Sir J. E. Tennent's work on Ceylon.

male has never, we believe, been found more than eighteen or twenty feet long. The food of the duyong consists chiefly of marine vegetables, which it finds at the bottom of inlets, in comparatively shallow water, where it is easily captured. Its flesh resembles good beef, and is much esteemed. The oil obtained from its fat is peculiarly clear and limpid, and is free from any disagreeable smell, such as most animal oils are accompanied with. It has not yet been produced in sufficient quantities to acquire a recognized market value. The blacks devour the carcase of the duyong roasted, after expressing the oil for sale to the colonists." *

In a recent anonymous work, entitled 'Rambles at the Antipodes,' &c., published in 1859, the duyong is mentioned as the yangan of the aborigines. This author, like every other (from the time of Sir Stamford Raffles and before), describes the meat of the duyong to be excellent, "when fresh having the taste of tender beef, and when salted nearly resembling bacon." Hence, perhaps, the apellation 'sea-pig.' The duyong, it is added, "yields an oil, which is found in cases of scrofula and other diseases to be more efficacious than cod-liver oil." The latter would seem to be rising in demand; worse luck for the animal! A friend informs us that it is most difficult to obtain even a portion of duyong meat at Malacca; as no sooner is a specimen captured than it is at once cut up and cooked by the Malays. Hence the difficulty of obtaining museum specimens.

Of the Indian duyong we possess a small stuffed specimen, presented by the Batavian Society in 1845; and the lower jaw, scapulæ, and four ribs of a larger but still young individual, recently found in an Andaman hut. The Andaman Islands are the most northern locality as yet ascertained for the species in the Bay of Bengal; and it must be rare there, or the bones would more frequently be found to decorate those rude lairs (huts they cannot justly be termed), together with the skulls of the small Sus andamanensis and of turtles. On the west coast of Ceylon Mr. Layard notices that duyongs are common in the Gulf of Calpentyn; the flesh of this animal being there also held in esteem. Sir J. E. Tennent, again, remarks their occurrence in all the salt-water inlets from the Gulf of Calpentyn to Adam's Bridge. They are found likewise along the shore and in the salt-water inlets of the Concan, where, as not long ago ascertained by the Rev. J. Baker, jun., of Mundakyum, Alipi, on that coast, they are known to Europeans as the seal. That gentleman took some pains to discover

* 'The Three Colonies of Australia,' (p. 337), by Samuel Sidney.

what the animal could be, and found that it was the duyong, which came to feed on the vegetable matter found about the rocks, as well as to bask and sleep in the morning sun (!). Forbes, in his 'Oriental Memoirs,' gives an account of these so-called seals as "abounding in the salt-waters of Travancore;" but his description of them is either inaccurate, or it must refer to some other animal (which is exceedingly unlikely). He says, "The Travancore seal has a round head, short ears, thick neck, tapering body, and flat tail, like a fish; it is web-footed, and the skin covered with a soft oily hair. Seals," he adds, "vary in size and appearance in different countries; at Anjingo they seldom exceed 4 feet [!] in length. They are gregarious and sociable; form parties on the banks of the rivers, but always plunge in at the approach of a stranger." *

In our Andaman specimen of a lower jaw the first molar has a minute forked crown, and proportionally very large root. Then follow three deciduary pre-molars, ground to a perfectly flat surface; and behind these a tuberculated permanent molar, which had nearly pierced the gum when the animal came by its death.

A complete skeleton of an adult duyong would be extremely acceptable for the Society's Museum; no matter how roughly prepared, provided no bones are wanting. Skulls, also, of adults of both sexes are desirable.

EDWARD BLYTH.

Zoological Notes from Aneiteum, New Hebrides.

By JOHN MACGILLIVRAY, Esq.

Description of Procellaria torquata, a new Species of Petrel.—Above light gray, especially on the back, shoulders and upper tail-covers; the feathers in the two first situations often margined with white. Crown, back of head and neck and auriculars sooty brown, which colour behind gradually blends with the gray of the back, and in front extends across the breast from each side to form an indistinct band. Wings projecting an inch beyond the tail, dark sooty brown; the secondaries tinged with gray. Tail very evenly graduated, of twelve feathers, grayish brown. Face, cheeks, chin and throat white; on the sides and front of the head the white merely tips the feathers, the base and centre of each being dark, giving a speckled appearance to the rest of that region. Lower surface white, except the undefined pectoral band; and on the sides, flanks and under tail-covers the

* Forbes' 'Oriental Memoirs,' 2nd edition, vol. i. p. 227.

feathers are minutely speckled with gray, and sometimes have also a dark central line. Under wing-covers white, showing as conspicuous a mark when the bird is on the wing as in P. Cookii, to which and to P. mollis it is closely allied. Bill black; tarsi fleshy black; toes and webs (except basal portion of latter, which are flesh-coloured) black. Total length $4\frac{1}{4}$ inches; extent of wings 28; wing $8\frac{1}{2}$; tail $4\frac{1}{4}$; bill from rictus $1\frac{3}{10}$ inch, and from base 1; tarsus 1; middle toe and claw $1\frac{4}{10}$. There is no outward sexual distinction.

The preceding description represents what is probably the adult plumage. There is another stage, perhaps indicative of the first moult, in which the pectoral band extends across the breast; and the whole of the lower surface behind this, instead of being white, is of a gray colour, the under plumage being white. From dissection I ascertained that females in both stages had laid eggs. A petrel* nearly allied to the present, and also appearing in two different styles of plumage, was found by me incubating as well in the immature as in the full dress.

P. torquata is not confined to the island of Aneiteum. I have seen it on various occasions off the coasts of Tana and Eramanga, and was assured by a native of the former island that it breeds in his district, which commences about twelve miles to the southward of Port Resolution. On Aneiteum it breeds in burrows on the wooded mountains of the interior of the island, the highest of which attains an elevation of 2788 feet. A young bird, not many days old, and covered with black down, was brought me on the 14th of Febraury, but I have not yet seen an egg. The Aneiteumese name is Katébu.

Description of Pteropus Geddiei,† a new Species of Pteropus.—General colour deep black. A pale reddish yellow patch extends from the occiput backwards across the shoulders, and includes the sides of the neck. Back covered with glossy adpressed black hairs, mixed with a few of a rusty colour; upper surface of upper arm very thinly clad with hairs; fore arm bare. Lower part of back and upper surface of thighs covered with longer and coarser black hairs, reddish at the tips. Head showing many grizzled hairs, and, as well as the throat

* From the Kermadec Isles. Specimens with the MS. name, P. Raoulensis, attached were sent by me to the British Museum several years ago. This bird should be placed by the side of P. Lessoni.

† In honour of the Rev. J. Geddie, who, in common with all the members of his amiable family, not only materially assisted me in forming my collection, while at the same time enjoying his hospitality, but has himself become a collector of zoological specimens for his friends in Nova Scotia and Canada.

and whole of lower surface, covered with coarse black fur extending a little way on the membranes, thinly covering the shoulders and thighs, but leaving the fore arms and legs nearly bare; rusty hairs on the sides of the upper jaw, the angle of the lower jaw, between the eyes in a triangular space, and at the base of the ears. Ears rounded at the tip, with rather more than the apical half bare. Total length 12 inches; expanse of membrane 49; occiput to tip of nose $3\frac{1}{2}$; ears $1\frac{2}{10}$ inch; fore arm 6 inches; thumb and claw $2\frac{4}{10}$; index $4\frac{8}{10}$; legs 3; feet to tip of claw $2\frac{1}{10}$.

While one of the great frugivorous bats, P. funereus, has a range extending from New Guinea southwards into Australia, in which country I have met with it in places about 600 miles apart (Port Essington and the Howick Isles), and a second species stretches at least across New Caledonia, having been shot by me both at Port de France on the west and Kanala on the east coasts, and a third (P. Kerandreni) is diffused over the great Archipelago of Fiji, on the little island of Aneiteum, the extreme width of which is less than nine miles, there are two very distinct species of Pteropus which do not intrude upon each other's districts; the smaller one, so far as I can judge, inhabiting the windward, and the other, which I have been describing, the leeward sides of the island. It has not been thought necessary to institute a comparison between these two last, as they need never be confounded with each other. Of the first, specimens were sent to the British Museum six years ago; but, although I met with the second on one occasion at that period and skinned four individuals, the want of preservatives and the intervention of two very hot days before I could get any, compelled me, with much regret, to throw away the skins. Like all other Pteropi I have met with—nine species in all—P. Geddiei is gregarious, and the sexes generally keep apart; nor could I ever find our when or under what circumstances they meet. At one great place of resort—a thickly wooded bank near the sea—behind a grove of bread-fruit and other trees, these bats are at times to be seen in great numbers, while for weeks, and even months together, there are none in the neighbourhood. At this locality, however, I think their arrival and departure are connected with the ripening of the two annual crops of the bread-fruit, to which they are very destructive. I have never shot any but males at this place, nor have I yet met with the female. The Aneiteumese are fond of these bats as food, and used to spin the fur into cordage used in ornamenting the person. Besides occasionally killing them with stones and short sticks, they sometimes catch them in traps similar to those used in fishing—circular, flat-bottomed baskets

made of Flagellaria indica, with a hole at the top for entrance, and some papaw apple for bait. The trap is fixed in one of the trees the bats are known to frequent. In Fiji a similar mode of catching them is practised. On the island of Moala a native one day agreed to take me where I should see some bats, and in due time called out "mbeka!" pointing out among the foliage of an Iambosa tree something dark in motion, at which I fired. My companion was speedily up among the branches like a monkey, and I then could discern a bat-trap set there, from which, with a malicious grin and averted nose, he drew forth and threw down to me two Pteropi, one quite putrid, the other killed by shot. Pteropus Geddiei has its favourite trees for roosting on during the day, generally some wide-spreading fig or banyan is preferred; once, however, I noticed a species of Acacia had been selected as a place of resort. During the day time, and while suspended from the tree, they are readily roused by any unusual noise, such as the crackling of a stick under foot, and are not very easily approached. Like the other large bats they are very tenacious of life, and cling to the branches as long as they possess the requisite strength, and sometimes remain suspended even after death. The males seem to be very pugnacious; I have seen them fighting among themselves on the trees, and a wounded one will furiously attack anything brought in contact with it. With their formidable canine teeth they inflict severe bites, and retain their hold of a mouthful with great tenacity.

The Aneiteumese generic name for Pteropus is Nekrei; the larger species is called Nawathelgau, and the smaller one Nalivatran. This last, besides feeding on the fruit of trees, is said to be fond of the berries of a Vaccinium, a low bush growing abundantly on the lower slopes of the hills.

On a Poisonous Property attributed to Conus textile.—On my first visit to Aneiteum I was told of a shell-fish which, on being incautiously handled, is said to eject a poison, causing, if it comes in contact with the hand, an immediate and peculiar sensation, then numbness of the hand and arm, followed by intense pain, usually severe illness, and not unfrequently death. The native name is Intrag, and the mollusk in question is the well-known Conus textile. Having frequently handled this shell-fish while collecting on coral reefs in the Pacific, Torres Strait, and the N.E. Coast of Australia, without having sustained any injury from it, I was naturally somewhat incredulous in the matter; yet as the general belief—which is never wholly destitute of foundation—was against me, I yielded to it so far as afterwards to handle with

caution any live specimen I saw. I was told that the small Intrags and those of certain localities (one of which is near my present residence) are reputed more dangerous than others. The Intrag is not usually considered dangerous unless the animal be touched, which of course no one here will do, except unwittingly, but some of the natives say that it can "blow" the poisonous influence upon the hand of an intruder from the distance of several inches.

On June 9th of the present year, about 10 P.M. I had brought to me a young man, my neighbour Niuenham, who was said to have recently been poisoned by the Intrag, and appeared to suffer intense pain. From what I could learn it seems that he and a companion had been looking for shell-fish by moonlight about two hours previously. N. had picked up in the shallow water something which he did not see distinctly. Immediately on touching it, and while his hand was in the water, he felt a sensation as if some very cold water had been "blown" on the palm of his right hand, and dropped the object, which he saw was an Intrag. Not long afterwards he went home, and soon began to complain of a numbness in the whole of his right arm and hand. This was immediately ascribed to his having touched the Intrag, and his companion went back to the spot for it, carefully picked it up, the shell with the animal retracted, and eventually it was given to me. A bandage was tied tightly round the sufferer's arm at a little below the shoulder, and when I saw him the arm was cold and much swollen, and the pulse about 50, and very feeble. I administered an enormous dose of the solution of muriate of morphia, as he suffered excruciating pain. A medical man in New Zealand having suggested the experiment of burying the hand and arm affected in fresh earth, this was done, but the patient could not endure it long, for he literally writhed in agony while lying on his face on a mat, with his arm in the ground. Meanwhile a man experienced in such matters had been sent for. On arrival he prepared a knife or two of strips of bamboo, and made two deep incisions in the upper part of the arm, one in front, another behind, below the ligature, which had been slackened. About half-a-pint of blood was obtained. Next morning at 8 A.M. I found that the morphia had produced sound sleep during the night, and that the bandage had been removed according to my suggestion. The right arm was swollen, and felt rather cold, but the pulsation was equally strong at each wrist, sixty-three beats to the minute. Means were taken to assist in restoring the natural temperature to the arm, and wine was ordered, to be discontinued on indications of reaction showing themselves. All pain, except from the incisions, had dis-

appeared, and in the course of about a week the patient recovered his usual health. With regard to this case it is right to mention that although satisfied by the circumstantial evidence that contact with an Intrag had produced extraordinary effects, yet I could not separate them satisfactorily from those fairly attributable to the ligature. No pain was felt before the bandage was applied.

A case which terminated fatally may now be mentioned. On the 28th of May, 1859, I went along with the Rev. J. Geddie to see a sick woman, who, fourteen days before, was believed to have been poisoned by her hands having accidentally come in contact with an Intrag while collecting shell-fish on the reef. The whole right hand and arm to within a few inches of the axilla were in a state of gangrene, with the bone exposed in several places. No hæmorrhage, however, had taken place. I could see that numerous small but deep incisions had been made in the arm. There was not, I may mention, as with a light skinned person, the same facility for ascertaining the exisience of a line of demarcation between the living and the dead portions of the body. Apparently, there was sound material enough to render amputation at the shoulder-joint possible, but, unfortunately, on the back of the shoulder, also on the sides of the chest, there were indications of incipient gangrene in the peeling off of the cuticle, and the formation of vesicles, rendering the operation unadvisable, because holding out no hope of saving life. In this case I learned that a tight bandage had been kept on for several days, probably of itself sufficient to induce mortification even in a healthy limb.

These two cases are the only ones of which I can say anything from personal observation, and I shall make no further comment than merely to observe that as I cannot find any special apparatus in the animal of Conus textile, or see any anatomical difference between it and C. arenatus (which is known to be innocuous) after examining both, I feel great reluctance in subscribing even to the universal popular belief on this island of the power of the Intrag to cause injury to man in the manner ascribed to it. A jet from the siphon of the animal might partially account for the first sensation experienced. No puncture or abrasion of the cuticle is ever spoken of, but in some cases, I have been told, the skin has been discoloured,—the word used being "emilmat," which means either blue or green.

On the Fishes of Aneiteum.—Before packing up a collection of fishes I may as well pen a few remarks. As it includes everything brought to me which was neither too large nor too small to be skinned

and stuffed conveniently, including upwards of a hundred species, caught with the net, hook, spear, hand or fishing-basket, common as well as rare, it may be looked upon as a fair sample of the fishes of the seas bordering this island, as well as of the fresh-water streams. Taking Cuvier's arrangement as a convenient guide, it may be stated that nearly all the fishes in question belong to the Osseous Series, and that about four-fifths are included in the first order or Acanthopterygii.

Among the Percidæ are several species of Serranus, as well as members of many other genera, the names of which I have no means of ascertaining. Two of these last are confined to the fresh water. Holocentrum is well represented by seven species, either of a brilliant red colour, or of silvery lustre; and there is also a species of the allied genus Missipristis. A solitary Upeneus may be mentioned, also a small Apogon not so brightly coloured as usual.

Of the armed-headed or hard-cheeked fishes a small Cephalacanthus was brought me; out of the water it can take vigorous leaps for a short time. But the most singular member of this family I have seen here is the Ndrukthannia, possibly a Pterois. It is a handsome fish, upwards of a foot in length, chiefly of a bright red colour, variously streaked and spotted, and remarkable on account of the great length of the dorsal spines and the enormous size of the ventrals and pectorals, the latter of which have the rays prolonged beyond the fin. The cheeks are armed with clusters of prickles, and there are other prickles and spines about the head. The formidable dorsal spines are believed to be capable of inflicting very painful and even dangerous wounds, attributed by the natives to some poisonous property inherent in them.

Of the family Sparidæ a Pagellus is very common, and there are two other fishes (one of a bright green colour) very much elongated in shape, with sharp snouts and strong teeth, the front ones hooked, which are probably of the genus Dentex. A solitary Mœna represents the fifth family.

The Squamipennes muster here in great force, including many species of Chætodon, Heniochus and Holocanthus, also a Chelmon, and some others allied to Pimelepterus. Many of the first, second and fourth of these genera are curiously diversified by black and yellow bands, stripes, and eye-like spots. One Heniochus has a dorsal filament as long as the whole body.

Of Scomberidæ there are few species, all of which, however, go in shoals. Caranx and Vomer are the principal genera.

There is considerable variety among the lancet fishes. Of five

species referrible to Acanthurus probably only one belongs to that genus, as now restricted, and the others, which are all of a very dark, almost black colour, to three allied genera. One species is remarkable for the enormous dorsal and anal fins, and this, together with the body being black, has originated a somewhat fanciful resemblance to the large bats (Pteropi), and one name serves for both objects. Two others, with the upper and lowermost caudal rays prolonged, have a curious orange-coloured patch on each side. A Siganus is common, as are also a Naseus and another fish allied to it, but generically differing by having a protuberance instead of a horn on the forehead, and the upper and lower margins of the caudal not prolonged into filaments. The two last come in over the reef in shoals with the flood tide, and inflict painful and troublesome wounds with their sharp lateral cutting plates, while dashing about among the fishermen's legs.

A fresh-water mullet, a foot or more in length, is common in the streams, where, also, are two species of a genus of fishes, which I may place provisionally among the mullets, not knowing its proper position. The first dorsal has six instead of four spinous rays, as in Mugil, both jaws are furnished with numerous rows of close-set teeth, and many of the rays of all the fins except the first dorsal are free at the extremity; but the most remarkable peculiarity consists in a fleshy flap behind the anus. They chiefly frequent still muddy pools and ditches, and bite eagerly at fish or meat bait. One of the two kinds—but perhaps the other is only the young—grows to a foot in length.

Among the members of the Goby family a marine Salarias and a Gobius may be enumerated. There are two fresh-water species (of different genera) belonging to this family; they are fond of resting on the stones in the rapid streams, probably adhering by means of the sucker-like disk formed by the union of the ventrals.

The Labridæ are probably the most numerous, both in species and individuals, among the various families of Aneiteumese fishes. This, I think, is generally the case where coral reefs abound. Although I have seen none of Labrus proper, yet in the collection there are eleven species of Julis, all once exhibiting beautiful colours, two Gomphosi, three Cheilini, an Anampses and a Xirichthys. Of this last it may be observed that, besides being somewhat comprehensive in form, it exhibits another analogy with the dolphins in its remarkable change of colour. When alive it is almost entirely waxy bluish white, but after death various colours in bands, patches and spots made their appearance on the skin for the first time. There is also a green and blue Scarus belonging to this family.

A solitary Aulastomus, which sometimes measures above a yard in length, represents the Fistularidæ.

The Order Malacopterygii does not, apparently, contain many Aneiteumese fishes. Belone, Hemiramphus, Exocetus and Plotosus are the only abdominal ones I know of. The last is carefully handled by the fishermen on account of the barbed spines, of which there is one in the first dorsal and each of the pectoral fins. A Phycis belongs to the first, and a Pleuronectes to the second section of the Subbrachiate Order. The Phycis alluded to may perhaps belong to another genus, as its ventrals consist of two rays each, instead of a single one. The fishes of the third section, or apodous Malacopterygians, are an Anguilla, common in the fresh water, and three or four species of Muræna, Ophisurus and allied genera.

The only Lophobranchiate fishes I know of are two kinds of Syngnathus.

The first or Gymnodontal division of the Plectognathi is represented by a fine large Tetraodon, covered, except, on the belly, with white spots, and a Diodon with long spines directed backwards, with the exception of a few of the foremost ones. The second or Sclerodermal division contains as many as seven species of Balistes, the most singular of which has numerous large, white, eye-like spots, and two kinds of Ostracion very closely resembling each other.

Of the cartilaginous fishes there is only one representative in the collection, a young Carcharias, probably C. melanopterus. Sharks, however, are not uncommon, and I have also seen at least one species of Trygon.

Description of Prisopus Carlottæ, a New Species of Leaf Insect. — Female. Body much depressed, slightly convex above, flat below; whole of upper surface and membranes rugose, also with small tubercles on the body, especially the thorax; lower surface smooth. Antennæ setaceous, nearly half as long as the body, of about twenty-five joints. Wing-covers their own width apart, very small (little more than one-tenth of an inch in length), rounded on outer and posterior edges, and straight on internal margin; wings also very small, when folded reaching the middle of the first abdominal segment, and projecting the tenth of an inch behind the covers. Abdomen of ten segments, slightly widening from the base towards the middle, then tapering to the extremity, with a faint central dorsal ridge above, and two lateral ones on the lower surface; a minute lateral appendage behind the fore legs, and four pyriform plates on each side between

the middle and posterior pairs of legs; second abdominal segment and subsequent ones with a leaf-like appendage on each side, rounded at the tip; the first three pairs small, gradually increasing in size, the next three very much larger, and the last three suddenly diminishing in size. Femora dilated externally by a deeply-toothed or scalloped leaf-like fringe; the tibiæ likewise, but in less degree, and the base of the tarsi to a less extent still; the inner margins of the legs also are fringed, but not very conspicuously, except in the case of the middle pair of femora. All these membranous fringes, as well as those of the body, are ciliated. The number of dentations on the outer margin of the femora agrees in three specimens before me, namely, anterior 9, middle 6, posterior 7. Length of body $2\frac{1}{2}$ inches; greatest width $\frac{6}{10}$ths of an inch; length of antennæ 1 inch. The colour is variable; it is either a dull grayish green, finely and irregularly mottled, or silvery gray also mottled, having greenish and yellowish shades, altogether reminding me of some of the lichens. The eggs are one-tenth of an inch in length, elliptical and slightly compressed; a mark on one side resembles the hilum of a seed, and a lid at one end is pushed off by the emerging larva, which is three-tenths of an inch long.

The Aneiteumese name of this insect is "Naling." It is said to be found on the trunks of trees. I have had only three full-grown individuals brought me, all females containing fully developed eggs. The specific name is intended to commemorate the occasional assistance rendered me by Miss Geddie while collecting here, more especially as this is one of her contributions.

JOHN MACGILLIVRAY.

Eagle and Wolf.—Our road led us in sight of the Putrid Sea. We met several herds of cattle, flocks of large birds, and some large eagles. Wolves are very common in these steppes, and they are so bold that they sometimes attack travellers. We passed by a large one lying on the ground with an eagle, which had probably attacked him, by his side; its talons were nearly buried in his back: in the struggle both had died.—'*Stephen Grellett's Memoirs*,' vol. i. p. 459.

Child attacked by an Eagle.—The wife of Zeller devoted herself in very early life to the Lord, and in this she appears to be faithful in endeavouring to perform her solemn vow. When about five years old she was playing on some of the rocky hills of the country; one of their large eagles saw her, and darted down upon her head: a man with a gun, not far distant, watched the motions of the eagle, but did not see the child; he fired and killed the bird at the very moment of his darting upon the child's head; great was his surprise, on coming to the spot, to find the dead eagle by the side of the child. The deep wounds made by his talons in her head show what a narrow escape she had from the voracious bird, and from being wounded or killed by the gun. This dear woman considers that her life, thus spared, is to be wholly devoted to

the service of God.—*Id.*, vol. ii. p. 341. *Both communicated by Samuel Gurney, Esq., M.P.*

Late stay of the Fieldfare (Turdus pilaris) *in Cambridgeshire.*—I have just been put in possession of the latest date that I ever knew of a fieldfare being shot in this county before—*i. e.* the 9th of May: with us they usually depart some time in April; I never before knew or heard of one being seen after that time here.—*S. P. Saville; Jesus Terrace, Cambridge; May* 18, 1860.

Anecdote of a Robin.—It is considered by the superstitious a bad omen to be followed by a robin. Mr. N. said the first Lady Albemarle had been feeding some little birds at her window, and one robin in particular had constantly attended her. Lady A. had left her own home on a visit to Mr. Cooke, of Holkham. The next morning a robin flew upon Lady A. as she was seated at the breakfast-table: she exclaimed instantly, "Oh, that is my robin! it has followed me from my home (about fifty miles distant). I am sure it is sent to warn me of death, and I shall die." Very soon afterwards she met with an accident, and died whilst at Holkham.—*Extracted from a private journal, and communicated by Samuel Gurney, Esq., M.P.*

Escaped Canary breeding.—We had a pair of canaries,—young birds of last year,—the hen of which escaped about three weeks ago. We heard of her as being seen by some boys in the woods, but she would not allow herself to be caught. Yesterday, however, she was caught on her nest, but was so roughly handled that she died before reaching us. The nest was in a thick hedgerow; it was formed of roots and dried grass, lined inside with feathers and down from her own breast, which was quite denuded. She was sitting on three eggs, which do not seem to differ from the eggs usually laid by canaries in confinement. It is probable, therefore, that she had paired with her companion, although we were not aware that she had done so previous to her escape.—*P. H. Newnham; Bagshot, July* 10, 1860.

Tree Sparrows.—"During the winter of 1858-9 we had great numbers of the tree sparrow all around Worthing. Many fields were covered with them. They disappeared in the spring. In no other winter since I have been here have we had them in such numbers, although we have had some stragglers each winter."—*Robert Gray; Worthing, May*, 1860. In reply to an inquiry Mr. Gray informs me that, being well acquainted with the tree sparrow, he was able to single them out from the others when flushed, and so shot several, of which he retained one specimen. Mr. Knox says ('Ornithological Rambles in Sussex,' p. 206), the tree sparrow is scarce in Sussex, but that probably it has frequently escaped observation. He too notices it being a winter visitor. Yarrell ('British Birds,' first edition) does not mention the bird as known to be found in either Sussex or Kent, but in the latter county I certainly killed tree sparrows at my native place (on the border of Sussex) between forty and fifty years ago, I believe, though at the period knowing and caring too little about Natural History to take much notice of the variety, or to attempt tracing the extent of its range. However, I have no doubt tree sparrows were (and are?) indigenous in that district, because nests were common in the *outside* of thatched roofs (see Yarrell, as above, p. 470), and the birds I shot belonged to one of the large flocks which always assemble round stubble fields immediately after harvest. Since this variety of sparrow has been so long overlooked in our neighbourhood, I fully anticipate that it will prove to be far more generally distributed than has been and is now supposed.—*Arthur Hussey; Rottingdean, May* 19, 1860.

Migration of, and Trade in, Goldfinches.—I have transcribed the following from a letter recently received. Having known the writer from his boyhood to this time, now

above twenty-eight years, I can vouch for his being not only a very intelligent person, but also that his statements may be fully relied upon.—*Id.* "I have for the last four or five years been watching the bird-catching boys, owing to my hearing that they sent from this neighbourhood some four or five hundred dozens of goldfinches each year in October. Not giving credit to such a statement, I have come to the conclusion that it is true nevertheless, for there have been annually from ten to twenty boys and men with their nets within a walk of Worthing, and I have seen one catch from twenty to forty in a morning; they have even caught over one hundred, if they speak true. Supposing they caught upon an average twenty each per day, it would amount to more than I have stated. One told me he knew eight hundred dozen were sent in six weeks from Brighton, Shoreham and Worthing. I cannot speak beyond Worthing, and certainly these bird-catchers do always get a new suit of clothes every November, and also seem to have money to spend at the public-houses for a long time afterwards. Inquiring among (these men) I find they are all of the same opinion, that the goldfinches migrate. This I have found no mention of in any work that has fallen in my way. My own opinion is that in passing Worthing they go along the coast from west to east, very straggling, but very continuous and regular, for a month or six weeks. The male birds fetch from four to six shillings per dozen in London; the hens about two shillings."—*Robert Gray; Worthing, May*, 1860.

Additional particulars of the Trade in Goldfinches.—In a statement I have received from one of the bird-catchers here, he gives the enormous number of 13,848 goldfinches per annum as sent from Worthing alone, but the calculation is so made that it may be somewhat fallacious. Only four of the catchers send the birds to London, these men taking what the others catch at the rate of four shillings per dozen. For their own protection in settling accounts with the London purchasers the above four are obliged to enter in a book the numbers sent. I applied to the most respectable among them, and he has his book still, but two have not kept theirs, so that I could not obtain the numbers correctly; but this young man said he knew exactly how many went out catching, so reckoning each man's take to be equal to those whose birds he sent to London, it gives the prodigious number before mentioned. The birds are sold to the dealers in London at five shillings per dozen the males and two shillings the females (but few of the latter are ever sent, males alone being wanted), which gives a sum of about £288 per annum. This appears to me almost fabulous, yet I must say I have tried for the last three years to disprove it, and cannot; all I have seen goes more to confirm the fact than to weaken it.—*Id.; May* 24, 1860.

Trade in Goldfinches: copy of Bird-catcher's Statement.—Average (?) of goldfinches caught at Worthing in a year:—

January, February and March	None.		
April	about	4	dozens.
May	„	10	„
June	None.		
July	about	5	„
August	„	15	„
September	„	20	„
October	„	750	„
November	„	300	„
December	„	50	„
		1154	

Arthur Hussey; Rottingdean, May 25, 1860.

*Note on the supposed Occurrence of the Hirundo bicolor of North America in England.**—I venture to send for exhibition a skin of the North American Hirundo bicolor of Vieillot, which was formerly the property of my late very good friend Mr. John Wolley, and which there can be little doubt was obtained from a bird killed in this country, though Mr. Wolley, with that admirable caution which distinguished him in recording the reported occurrence (Zool. 3806), was careful to mention that there was "a possibility of mistake" in the matter. I think that perhaps some members of the Society will view this specimen with a certain amount of interest; but, apart from this, my object in its exhibition is mainly to draw the attention of naturalists to a matter which is every day becoming of greater consequence to those ornithologists who chiefly occupy themselves with the Avi-fauna of any one district. I refer to the occurrence within particular limits of stray examples of exotic species. It is not only "British bird" students who find in these alien immigrants a great cause of perplexity. To whatever country we go, we are, perhaps before we have well ascertained the number of the *bonâ fide* species, puzzled by some wanderer turning up exactly where he was least wanted. In my own opinion, the ornithologist must accept his position with all its responsibilities; he chooses to study a class of beings, some of whom, for all sublunary purposes at least, are blest with almost infinite powers of locomotion. He must, therefore, not complain if in the course of a morning's walk here in England, an Australian swift flies in his face, or he picks up a dead crossbill of a Transatlantic species; and he must invoke no *Deus ex machina* in the shape of an auxiliary-screw clipper or a careless aviary-keeper to account for the incident. Facts like these hardly admit of a doubt, and force themselves day by day more and more upon the notice of the thoughtful naturalist. For some time, indeed, European ornithologists have been accustomed to regard the properly authenticated appearance of an exotic species, which there may be good reason to suppose have reached our shores without intentional human aid, as sufficient ground for including it in the list of our birds. But as observers have of late so largely increased, so have these occurrences been more frequently noticed; and it seems absolutely necessary to prescribe some limit to prevent our really native species from being outnumbered by these foreigners. The difficulty is to know where to draw the line; and to this point I would invite the careful consideration of naturalists. It may be all very well to call Thalassidroma Wilsoni and Mergus cucullatus European birds; but because a single individual of Regulus calendulus or Dendræca virens has reached the Old World, it is absurd to include either of those species in its Fauna. I cite these instances, because they are all from that continent whence most of our occasional visitants arrive; so much so, that one is almost driven to the conclusion that there is no *primâ facie* reason why examples of the greater number of birds of Eastern North America should not, *favente zephyro* (the prevailing strong wind in Western Europe), make their appearance on our shores in course of time. Then, on the other hand, the last two additions to the list of so-called "British birds" have been from the opposite quarter. Are Syrrhaptes paradoxus and Xema ichthyaëtus to take their places in the books elucidating British Ornithology by the side of the red grouse and the peewit gull? It appears to me that we gain nothing by deferring a decision on the subject, and

* From the 'Proceedings of the Zoological Society of London,' February 28, 1860, and obligingly communicated by the author.

I trust that these remarks will not be deemed unnecessary by those who are competent to deal with the matter.—*Alfred Newton; Elvedon, February* 28, 1860.

Occurrence of the Whimbrel (Numenius phæopus) *in Cambridgeshire.*—A friend of mine has sent me a fine specimen of the whimbrel, which he shot at Caldecot, in this county, on the 4th of May, 1860. The whimbrel may be considered an uncommon bird in Cambridgeshire, only one or a pair occasionally occurring, and then in some of our fenny districts, or more commonly in a turnip field, the young tops of which it is particularly partial to.—*S. P. Saville; Jesus Terrace, Cambridge.*

Toads falling in a Shower of Rain. — I was out insect-catching by the side of the river Waveney, about a quarter-past 9 on Friday night, when a thunder-storm came on. I ran for shelter to the buildings at Aldeby Hall. The rain came down in torrents. Just before I was clear of the fens I observed some small toads on my arms, and several fell in my net, and on the ground and paths there were thousands. I am quite sure there were none in my net before I started, as I took a Leucania pudorina out of it. I believe they fell with the rain out of the clouds. Can you enlighten me on the subject? Two other persons have told me that they met with the same occurrence some distance from the spot in which I was situated.—*W. Winter; Aldeby, July* 23, 1860.

[I believe I have rather a disagreeable tendency to smile at showers of fish, frogs and toads; and my correspondent appears to have an idea that I shall be incredulous: nevertheless, I feel it a duty to insert this communication, simply remarking that the fact of toads covering the pathways and ground is by no means corroborative of the supposition that "they fell with the rain out of the clouds:" I think rather the reverse.—*Edward Newman.*]

Gossip on Spiders. By R. H. Meade, Esq.

Several years have passed away since I first endeavoured to excite an interest in the study of British spiders through the medium of the 'Zoologist;' and though the difficulties attending the investigation of the subject (the principal of which has been the want of any English systematic work upon these animals) have prevented my attempts from meeting with all the success I could have desired, yet, judging from the numerous communications that I have received at different times from naturalists in almost all parts of the United Kingdom, the seed sown has borne some fruit. I am proud to think that I have been the means of inducing one or two entomologists to take up Arachnology in earnest, and have thus indirectly tended to advance our knowledge of English spiders. I may especially mention the name of my friend Mr. Pickard-Cambridge, who has himself dis-

covered, during the last two or three years, more new British species than had been added to the list for many years before.

I am happy to know that the greatest impediment to the advancement of my favourite pursuit is on the point of being removed; for the long-promised work on British spiders, by Mr. Blackwall, is at last in the press, and the first volume will, I hope, very soon be published by the Ray Society, with numerous and accurate figures by Mr. Tuffin West. As soon as this appears, naturalists will no longer have any excuse for neglecting these most interesting objects of study.

In my earliest communications to the 'Zoologist' I entered into the subject of preserving spiders; and the further experience of years has fully confirmed me in still advocating the plan I first proposed, viz., that of putting up specimens in small glass tubes filled with spirits of wine. For the larger specimens I use the ordinary rectified spirit of the druggists, and for small species two parts of this mixed with one part of water. The only alteration I have adopted is in having the tubes converted into small bottles, by the formation of a slight constriction or neck near the mouth, so that the cork can be compressed and the rapid evaporation of the spirit prevented.

I preserved some specimens for three or four years in a strong solution of sulphate of magnesia; and with a few it answered admirably, but in most cases I found the colours to become dark and altered in the course of time. I put up a number of species in this saline solution, and gave them to the Entomological Society of London five years ago, but I have not seen them since, and should be much obliged if some member who has the opportunity would inspect them, and let me know how they have kept.

During the last two or three years I have had but few opportunities of searching for new British spiders, and consequently have no new captures to record; and, as far as I have had the means of forming a judgment on the subject, I am of opinion that the unusual drought of the last two summers has been very unfavourable to spider life. I spent a few days during the summers of both 1858 and 1859 in a locality in Oxfordshire which I had found particularly rich as a collecting-ground on previous occasions, and in both the seasons I could scarcely find a spider. Vegetation was very much dried up, and the spiders seemed to have evaporated along with the moisture. Mr. Blackwall tells me that he also noticed this scarcity; and Mr. N. B. Ward (the well-known author of 'Observations on the Growth of Plants in Closely-glazed Cases'), when I met him at the Leeds Meeting of the British Association, said he had particularly remarked

that spiders delighted in moisture, and were most abundant in wet seasons.

Having mentioned the British Association, I may perhaps be allowed briefly to allude to a paper which I read at the Leeds Meeting in 1858 (which has since been printed in the 'Reports'), on the Anatomy of the Spinning Organs of Spiders. There had long been a difference of opinion among naturalists as to the power which spiders possessed of shooting out their webs. Some thought that they had the power of propelling a thread from their spinnarets with great force and in any direction, and that it was in this way that the filaments of gossamer are formed, and also that threads are stretched between trees divided by a stream of water. On the contrary, others, among whom I may particularly mention Mr. Blackwall, were of opinion that all floating threads must have been drawn out of the spinnarets by a current of air, the spider only emitting a little viscid fluid, and taking advantage of any breath of air that may arise. On carefully dissecting the abdominal organs I found that the glandular sacs which secrete the strong threads in question are all furnished with a highly contractible fibrous coat, which also surrounds the ducts conveying the silky fluid to the spinnarets. This coat bears some resemblance to the fibrous coat of the arteries in man and the higher animals, and, in my opinion, must enable the spider to eject the fluid forming the threads with considerable violence.

Rambling on from one subject to another, we now come to a discovery which has lately been made in the history of spider life, viz., that a small species lives in large numbers, in a gregarious or social state, in the deep subterranean galleries of some of our northern collieries, where it spins extensive sheets of web. The existence of masses of web-like tissue has long been known in these localities, and has before attracted the attention of naturalists; but though these masses have been suspected by some to be the production of spiders, they have generally been looked upon as the mycelia or filamentous portions of Fungi. In the beginning of February last, however, I received a small spider from Mr. Stainton, with the request that I would determine its name. It had been sent to him by Mr. Morison, of Pelton Colliery, Chester-le-Street, Durham, with the information that it was the fabricator of the webs in question. The spider which I received was not quite an eighth of an inch in length, of a yellowish brown colour, and had become dry and shrivelled. It belonged to the genus Neriëne, but in its dried state it was impossible to determine its specific name. I was very sceptical as to the power of such

a minute creature to fabricate such immense sheets of web as were described, and was even doubtful whether they were animal productions at all, not having had an opportunity of examining them. I expressed these doubts to Mr. Stainton, and said at the same time that the latter point might easily be settled by looking at some of the so-called web with the microscope.

Shortly after this I had the pleasure of hearing from Mr. Morison himself, who sent me a living specimen of the spider, and a portion of web wound round a piece of wood. I immediately found that this was genuine spider's web, which had become much blackened by coal-dust; and adhering to it were numerous minute scales from the wings of small moths (Tineidæ ?), which had evidently been the food of the spiders. The spider itself was an adult specimen of Neriëne errans, a small species which had been described by Mr. Blackwall in the 'Linnean Transactions' (vol. xviii. p. 643), and hitherto had only been found by him occasionally in the fields in Lancashire and North Wales. To be quite certain regarding the identity of the species I obtained several more specimens from Mr. Morison, comprising both adult males and females, and submitted some of them to Mr. Blackwall for his opinion, which coincided with my own. They slightly differed in colour from the ordinary above-ground specimens of Neriëne errans, being of a more dusky tint, but that was probably owing to the dark nature of the locality in which they had lived. Mr. Morison stated to me that the pit (named the Pelton Colliery) in which these spiders were found is 320 feet below the surface of the ground, and also that seventy-five horses and ponies are employed in it. He suggests that the insects upon which the spiders live are probably introduced with the fodder for the horses; and perhaps the spiders themselves were taken down in the first instance in the same manner.

The spiders are met with in the portions of the pit which are not at present being worked, and the webs are generally spun in galleries, through which little or no air passes. When a rent has been made in one of the webs, the little spiders may be counted by scores together, repairing the damage. In one of his letters to me Mr. Morison says, "On passing through the portion of our under-ground workings, last night, in which these webs abound, I observed that the gaps I had made in the webs on my last visit to that quarter were being spun over again; and on one of them I counted twenty-three or twenty-four little spiders busily engaged in mending the rent."

It is quite a new trait in the character of spiders that a number of

small individuals should combine together in the adult state to fabricate large webs. The great cobwebs formed in our cellars and outhouses are always constructed by large spiders (such as Tegenaria civilis or Ciniflo similis), which, though living in close proximity to many neighbours, have each their own web and separate retreat, in which they watch for their prey. This tribe of animals, however, seems endowed with peculiar sagacity, which enables them to adapt themselves to new circumstances, and to acquire new habits. In support of this remark I will adduce another illustration, which I will give in the graphic words of my friend Mr. Edwin Birchall, by whom the fact was particularly pointed out to me, though I had noticed it before receiving the letter in which he says :—"Did you ever observe how spiders frequent lamp-posts? The habits of the tribe, lovers of darkness (no doubt because their deeds are evil), would not lead me to expect them in such a locality; so I conclude they go, not because they are attracted by the light, but because moths are. If this is so, is it not a curious development of instinct? I have constantly found not only webs stretched across the glass, but large fellows lying perdus in the corners of the lamp waiting for prey. I cannot comprehend how a spider travelling along a road can arrive at the conclusion that he will find a sinner at the top of a lamp-post, or the development of such a marvellous instinct since the era of lamps. If it be not *reason*, it is surely very much like it." The spider that I have noticed in this situation has been Epeira similis.

I have one more circumstance to mention in reference to the economy of spiders, and then I will bring this gossip to an end for the present. On the 16th of March last I received from Mr. E. Parfitt, of Taunton, a large nest of Agelena labyrnthica, which he had found attached to the bare twigs of a hedge. It consisted of a sac of compact white silk, containing two or three cocoons, as is usually the case in the nest of this spider. Mr. Parfitt had never noticed it before, and sent it to me thinking it might be rare or curious. This species is very common in many localities, but the point of interest attached to the nest was, that on its arrival at my house it contained a number of small spiders already hatched. I placed it in a box with a glass top, where these little creatures continued to live and spin their webs, for a period of seven or eight weeks, without obtaining any kind of food. During this time they did not appear to grow, or undergo any alteration in shape. I thought it rather an extraordinary circumstance that the eggs of this spider should be hatched so early, and particularly in such an inclement season as the last, and won-

dered what food the young spiders could find to live upon, unless something had been provided for them by their parent in the cocoons. On looking into Mr. Blackwall's 'Catalogue' I found no mention of the time at which the young spiders usually appear; neither is there any information on the subject in Walckenaer; but on referring to Martin Lister's 'Tractatus de Araneis,' published in 1678, I found my observation fully confirmed. He says that he kept the eggs of this spider (described under titulus xviii.) in a box all the winter, for the purpose of watching them, and found that the young spiders emerged from the eggs in February, and continued to live without alteration and without any food until the middle of April, when he allowed them to escape.

R. H. Meade.

Bradford, June 21, 1860.

Proceedings of Societies.

Entomological Society.

July 2, 1860.—J. W. Douglas, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'Journal of the Proceedings of the Linnean Society,' vol. v. No. 17; presented by the Society. 'The Zoologist' for July; by the Editor. 'The Athenæum' for May; by the Editor.

Election of a Subscriber.

C. Miller, Esq., 17, Silurian Terrace, Dalston, was balloted for, and elected a Subscriber to the Society.

Exhibitions.

Mr. Stevens exhibited a portion of a collection of drawings of European Lepidoptera, in which the wings were formed by transferring the scales from the wings of the insects by a process not ascertained, the bodies and limbs being afterwards beautifully drawn in water-colours. Mr. Stevens stated that the entire collection was contained in seven portfolios, and comprised nearly the whole of the European Micro-Lepidoptera; it had been formed in Germany, by the labour of a lifetime, and now sent to England to be disposed of at a very moderate price.

The specimens exhibited were much admired by the Members present, some of whom stated they had tried various modes of transferring the scales of Lepidoptera to paper, but with very unsatisfactory results.

Mr. Janson exhibited the following Coleoptera, taken at Rannoch by Mr. C. Turner, viz., Otiorhynchus septentrionis, *Herbst*, Scolytus Ratzeburgii, *Janson*, Magdalinus carbonarius, *Fab.*, Rhagonycha paludosa, *Fallen*.

Mr. Janson also exhibited a specimen of Homalota subterranea, *Mulsant.*, a species only hitherto detected in France, which he had found at Mickleham, Surrey, on the 23rd ult., under a stone, in a nest of Formica flava. He also exhibited Ischnoglossa rufopicea and Conosoma bimaculatum, found beneath bark of oaks at Colney Hatch.

Mr. McLachlan exhibited a fine specimen of Chrosis Audouiana, lately caught at Darenth Wood, Kent.

Mr. Douglas exhibited the following Coleoptera, found in the sap exuding from the perforations formed in oaks by the larva of Cossus ligniperda, viz., Cryptarclus imperialis, Epuræa 10-guttata, Tachinus bipustulatus, Homalota cinnamomea, H. hospita, and Omalium planum. He also exhibited Conopalpus testaceus, bred from rotten oak-branches from Richmond Park.

The Rev. H. Clark sent for distribution amongst the Members specimens of Laccophilus variegatus, *Germ.*, taken by him at Pevensey in June last.

Mr. Lewis exhibited specimens of Thiasophila inquilina, found at Charlton in nests of Formica fuliginosa. Mr. Lewis remarked that he had, at the Meeting of the Society held on the 2nd of April last, exhibited a specimen of Telephorus atra, *L.*, and stated it to be a species unrecorded as British; but he had since found that it had been long before included by Mr. Murray in his 'Catalogue of Scottish Coleoptera.'

The Secretary read a letter from R. J. L. Guppy, Esq., Port of Spain, Trinidad, on the habits of an insect allied to, if not identical with, Ranatra linearis of Europe, which he had found in streams in that island.—*E. S.*

Occurrence of Acherontia Atropos near Banff. — A specimen of this insect was taken at the end of June, by some school-children. The species is somewhat rare in this quarter. Is not June an early date for it to be abroad? — *Thomas Edward; Banff, July* 2, 1860.

Description of the Larva of Eupithecia pumilata. — Short and stumpy, tapering slightly towards the head. Ground-colour pale yellowish olive, reddish olive or rusty red. Central dorsal line dusky olive, almost black. Down the centre of the back a chain of dusky arrow-shaped spots, more or less distinct, and becoming merged in the dorsal line on the anterior and posterior segments. On each side a broad ribbon-like stripe, yellowish in the middle, dusky at the edges. The dorsal spots bordered interruptedly with yellow. Spiracular line yellowish. The larvæ from which the foregoing description was taken were reared from eggs sent me by Mr. Hellins, at the end of May, and fed on flowers of Anthriscus sylvestris. They were full-fed at the end of June, and the first perfect insect appeared July 16. Mr. H. tells me he has reared the larva on flowers of Clematis. The pupa, which is enclosed in a slight earthen cocoon, has the thorax and wing-cases pale yellow; abdomen short, yellow; tip red, divisions slightly so. The perfect insect appears in April and May, and again in July and August.—*H. Harpur Crewe; Horndean, July* 18, 1860.

Habits of Macroglossa stellatarum.—I was much interested, the other day, in watching a female of the above species depositing her eggs; the locality she selected was a high bank on the road-side. My attention was first directed to her movements by a loud humming noise. She flew in and out of the herbage in a very busy manner, occasionally alighting for a moment, and then off again. I immediately suspected that she was depositing her eggs, and upon careful examination found that such was the fact: by following her about I soon succeeded in obtaining a small quantity. I am unfortunately no botanist, and cannot therefore give the scientific name of the plant she selected, but it will probably be known to most of your readers as "robin-run-the-hedge." I was not aware that the larva fed on this plant. Nothing could be more interesting than to watch the unerring instinct with which she picked out the right plant from the quantity of herbage covering the bank. It was very difficult to follow her motions: the whole operation was like a flash of lightning.—*Joseph Greene; Ringwood, Hants.*

Abundant occurrence of Sesia Muscæformis? near Torquay.—Scarcely any of my readers are old enough as entomologists to recollect that twenty-eight years ago I published, in the 'Entomological Magazine,' a little Monograph of the Species of Sesia found in England, and that I added to the usual list two species, with descriptions from single specimens. One of them appeared under the name Muscæformis, from a single specimen taken a few miles from Torquay, and at that time in the hands of the late James Francis Stephens. This insect has been taken in abundance during the present summer on the Devonshire coast, settling on the blossoms of the wild thyme, at a distance of about fifteen miles from Torquay. With regard to the name some little difference of opinion appears to prevail: the names of Tenthrediformis, Hylæiformis, Sapygiformis (J. J. Reading), Philanthiformis (G. King), and Braconiformis (G. Wailes), have been very confidently applied. I am not certain of the authorities for these names or of their dates: my name of Muscæformis dates from Esper, 1777, but it is also described in a work quoted by Treitschke and others under the name of 'Vieweg. Tab. Verz.,' with which I am unacquainted; the description is referred to as at vol. i. p. 18, species 9. Owing probably to the somewhat unskilful mode in which these insects have been captured there are none in sufficiently good condition for me to draw up a very precise description at present; I may, however, remark that the number of pale rings on the abdomen is three only, instead of five: the margin of every abdominal segment is glittering and appears pale, but I am convinced would not be so in perfect specimens: the indistinct whitish annulus on the antennæ of the female distinguishes this from all cognate species.—*E. Newman.*

Food-plant of the Larva of Eupithecia rufifasciata.—In addition to to the food-plants mentioned by the Revs. J. Hellins and Crewe of the larva of this species I may name the common broom. I do not, however, think that this is its favourite pabulum. Being at the time ignorant of the species, I searched diligently, but could only find about a dozen, all of which were on a single plant. I discovered two or three pupæ spun up in the leaves.—*J. Greene; Ringwood, Hants, August* 10, 1860.

Dicranura bicuspis.—On the 20th of June I went out for a day's entomologizing; when I had fairly gained the hunting-ground where I intended to commence operations the rain began to come down in torrents, so of course I concluded that to make the best of my way back was my wisest course, and commenced my retreat accordingly; but in turning to shelter under some alders I was both surprised and delighted to see a beautiful specimen of a male Dicranura bicuspis sitting on the

trunk of one of the alders, immediately above its pupa-case; I immediately proceeded to box it, considering myself as lucky as I had a few moments before considered myself unlucky. This is the second specimen of D. bicuspis which has fallen to my lot, having taken a pupa from an alder in 1858, but, unfortunately, being from home when it emerged, it had so beat itself about that I had some doubts as to its being a *bona fide* D. bicuspis.—*T. Meldrum; Millgate, Ripon.—From the 'Intelligencer.'*

Capture of Acronycta Alni at Sugar.—On the 23rd of June I had the good fortune to take a fine specimen of Acronycta Alni at sugar, in Haw Park, near Walton Hall.—*Charles Roberts; Elm Street, Wakefield, July* 3, 1860.—*Id.*

Larvæ of Caradrina cubicularis.—At the end of May last, upon removing some logs of wood which had supported a hay-stack, I observed, in the crevices, the signs of a cocoon. Upon splitting one of the logs a number of larvæ fell out. They were dirty white, with a few black dots, and about an inch in length. I entertained little doubt that they belonged to the genus Caradrina; but as I had never seen any of the larvæ of that genus I took one of the logs into my insect-room, and in due time my conjecture proved correct, the larva producing Caradrina cubicularis. They go very deep into the crevices, and spin a toughish cocoon mixed with abraded wood. The above would not be worth mentioning were it not that so little is known of the habits of this and other allied genera.—*J. Greene; Ringwood, Hants, August* 10, 1860.

Description of the Larva of Tæniocampa Populeti.—This larva seems to be little known among entomologists generally, and perhaps an accurate description, taken from living larvæ, may be acceptable to the readers of the 'Zoologist.' Ground-colour pale green, back whitish. Dorsal lines three, white, the central one broad and distinct, the two others narrow and indistinct. Head buff, when young blackish. Segmental divisions yellowish. Spiracles enclosed between two narrow waved whitish lines. Body sparingly strewed with whitish hairs. Feeds between united leaves of various species of poplar, preferring that known as the black Italian. Full-fed throughout the month of June. In habits and appearance this larva closely resembles that of T. subtusa, and when young may easily be mistaken for it. The pupa resembles that of T. gothica.—*H. Harpur Crewe; Horndean, Hants, July* 18, 1860.

Occurrence of Agrotera nemoralis in Sussex.—I took a specimen of this species last month, on the wing, at Woodsdale, near Battle.—*John Porter, jun.; Lewes, June* 16, 1860.—*From the 'Intelligencer.'*

[Has any entomologist acquainted with Agrotera nemoralis seen and named this specimen? The species is of great rarity.—*Edward Newman.*]

Exæretia Allisella Bred.—Seeing a notice in the 'Entomologist's Intelligencer' of yesterday, by Mr. Stainton, that he had bred E. Allisella from larvæ sent him by Mr. Gregson on the 28th of May last, in which Mr. Stainton remarks, that from the tendency of the perfect insect to go greasy in collections the economy of the larvæ as a stem-borer might have been deduced, I send the following observations. Mr. Stainton is perfectly right in his remark, and of this I was long since satisfied, but amongst such a mass of weeds of various kinds it was difficult to ascertain in which of the plants it did bore, and, although I have sought diligently for the last four years, it was not till the 2nd of last May that I succeeded in finding it, not by seeing the stem bored in the first instance, but by observing one of the young shoots of the Artemisia in quite a drooping state. I at once suspected the cause, and took out my knife, cut the stem and the small bore off, and soon discovered the larvæ. After taking about a score I left the remainder, which were seen now, as the sprouts were just springing

from the old roots, and were from two to three inches high. A week after the damaged sprouts were completely hid by their more vigorous fellows, and no one could have found them from any visible evidence in the plant without being told. I told Mr. Gregson about a fortnight or three weeks after, and in a few days he came to Warrington and went to the place, and, knowing it was there, of course found it. The larvæ on the 2nd of May were about half-grown, and must, I think, have hybernated, as I could not see any borings in the old roots. The colour was pale brown with three rows of black dots on each side, their position subdorsal, lateral and spiracular. On examining a full-grown larva I found the space below the lateral line greenish. The first imago emerged on the 29th of last month, since which date I have had eight more out.—*James Cooper; Museum, Warrington, July* 15, 1860.

Larva of Diplodoma marginepunctella carnivorous.—I have in my possession a larva of the above species, which I found at West Wickham last May, and, since I have had it, it has eaten one Tortrix, several common house-flies and some few Micros. I have never given it any green food, but kept it solely on insects, which it has greedily devoured.—*C. Healy;* 74, *Napier Street, Hoxton, N., August* 9, 1860.—*From the 'Intelligencer.'*

Larva of Talæporia pseudo-bombycella carnivorous.—I have also a larva of this species, which, after eating two house-flies and one male T. pseudo-bombycella, has fastened one wing of the deceased T. pseudo-bombycella to the top of its case, where it stands bolt upright, giving the case a very comical appearance.—*Id.*

Coleophora vibicella.—On the 3rd of July, 1859, Mr. John Bradley, of Worcester, conveyed some of the larvæ and pupæ of this species from Trench Woods, and distributed them amongst Genista tinctoria at Middleyard, near Bransford, Worcestershire: visiting that place on the 3rd instant I found numerous recent cases of the larvæ, and one fine imago.—*J. E. Fletcher; August* 7, 1860.

Observations on Coleophora melilotella.—Only a single example of this insect, for which I proposed the above name, has been reared, and this is now on Mr. Stainton's setting-board. It belongs to the same group as C. Frischella, and seems to stand intermediate between that species and Deauratella. In the specimen bred the green is of a different hue, and should this be the case with those captured in their natural haunts it will serve as an easy character to distinguish it from the allied species. There may be other characters as decided by which it may be recognised at first sight, but not having yet had an opportunity of making a minute investigation I leave the matter for the present, contenting myself with the fancy that I see C. conspicuella a drug and this new one conspicuous.—*John Scott;* 13, *Torrington Villas, Lee, S.E., June* 26, 1860.—*From the 'Intelligencer.'*

Larva of Asthenia coniferana.—I have bred A. coniferana from larvæ furnished me by W. Backhouse, Esq.; they feed in the bark of Scotch fir, turning part of the "frass" outside; they are dull yellowish white, with the head pale brown, and with no spots. Length about five-eighths of an inch.—*John Sang; Darlington, June* 1, 1860.—*Id.*

Carpocapsa Reaumurana.—Under this name I have given to many entomologists specimens of a Carpocapsa bred from chestnuts. It is described and figured by Réaumur, vol. ii. p. 501, pl. 40, fig. 13, 14, 15. It appears to be distinct from C. splendana, C. amplana and C. fagiglandana.—*Carl von Heyden.—From the 'Correspondenzblatt,'* No. 7, p. 55.

[This larva infests the chestnuts sold in London every year: I found of last year's

produce that eighteen out of fifty contained the grub; the perfect insect I have never seen alive.—*Edward Newman*].

Ephestia pinguedinella.—It may perhaps interest some of your readers to know that Ephestia pinguedinella may now be taken and examined in all its stages, in the decayed bark of the ash. The larva, which feeds within the bark, forms a slight cocoon, with an opening to the air, and by removing the bark, which has been perforated in every direction by the insect, any number of pupæ or of larvæ may be collected from it. Whilst collecting some pupæ last week I found the pupæ, the larvæ, and the perfect insect depositing her eggs, as it appeared, all within the space of a few inches.—*Rev. B. H. Birks; Stonor, Henley-on-Thames.—From the 'Intelligencer.'*

Hymenoptera in repose.—Since the publication of the Rev. A. R. Hogan's note ('Intelligencer,' No. 193, p. 84) on the singular manner in which Hymenopterous insects are in the habit of reposing, three instances have come under my own observation, two of which occurred during the eclipse of the sun on Wednesday last: wishing to ascertain whether these individuals had settled themselves down for the night or whether their slumbers would end with the eclipse, I remained near the spot and kept an eye upon them. One had attached itself to the point of a blade of grass upwards of six inches in length, and, as a brisk wind was blowing at the time, the insect was in consequence continually being violently swung from side to side, notwithstanding which, and the unceasing buffets it received from the stems of the surrounding plants, it resolutely maintained its hold. No sooner had the eclipse ended, and the clouds (which make it an invariable rule to assemble on such occasions) dispersed, than both the insects woke up and were again upon the move, actively pursuing their ordinary avocations. Both these and the one I had observed on a previous occasion were of one species. I have sent one of the individuals to Mr. F. Smith, who will doubtless be obliging enough to name the insect. [Nomada ochrostoma].—*S. Stone; Brighthampton, July* 21, 1860.—*Id.*

Hymenoptera in repose.—Mr. Stone writes to say that he has sent you a communication respecting a singular mode of reposing observed during the eclipse last Wednesday, and desires me to furnish the name of the bee so discovered: it is Nomada ochrostoma, a female of the species. I may add that, a fortnight ago, on one of the dull mornings,—of which we have had so many lately,—I saw the same species of Nomada suspended at the side of Bishop's Wood, Hampstead. I suspect it is not an uncommon mode of reposing, but I never observed it before, although others have, and have published their observations. Mr. Stone asks me to add any observations of my own: the above is all I have to record.—*F. Smith; British Museum, July* 24, 1860.—*Id.*

[I believe I made the first observation on this curious fact in 1832; the species were Nomada furva and N. borealis (see Zool. 6468).—*Edward Newman.*]

Scarcity of Hymenoptera in 1860.—Bombi have not been so few in number since the year 1828 (a season of summer floods); the long frosty season in April and part of May kept them back, and the unprecedented wet weather in June destroyed two-thirds of the nests begun by the females. I have observed few males of any of the species in this neighbourhood; last summer they abounded, and the males appeared a fortnight before their usual time. I have captured one nest of the B. Derbamellus with about sixty inhabitants. Up to this day I have not seen one young wasp; at the commencement of May I saw several queen wasps: the wet weather seems to have destroyed the greater part of them also; last July and August they abounded in this locality. Perhaps some of the readers of the 'Zoologist' may make some remarks as

to how these insects have fared in other places, and whether this scarcity be universal. The temperature in June and July has been on an average about 15 degrees below the same months last year,—nevertheless, when fine, a delicious temperature for exercise, being neither too hot nor too cold.—*H. W. Newman; Hillside, Cheltenham, July* 28, 1860.

Calosoma Sycophanta in the Isle of Wight.—A few days since some young friends brought me a large beetle to look at, which proved to be no less a prize than a splendid Calosoma Sycophanta. It was taken while crawling up the trunk of a tree, in a meadow bordering upon the sea-shore at Bembridge, having probably been disturbed by the hay-makers, who were then at work in the field. This is, I believe, the third instance in which the insect has been observed in the Isle of Wight, single specimens having been captured at Bonchurch, in January 1852, and at Freshwater in July, 1859 (Zool. 3359 and 6656).—*A. G. More; Bembridge, July* 12, 1860.

Rhynchites Betuleti.—I have taken both sexes of this beautiful species plentifully this year in the two-year-old clearings at Darenth. Early in the season only stragglers, and those chiefly males, are to be taken, settling in the sunshine on the leaves of any trees, though the hazel and dwarf aspen are their chief haunts. When found on the latter the small examples are at first sight hard to distinguish from large specimens of R. Populi (both species being variable in size, but they may be separated by looking at the under-sides, which in the latter are blue, the whole body being concolorous in R. Betuleti. At the end of June, when coupling, they may be found abundantly by examining the top twigs of the hazel bushes, and while doing this a net or umbrella must be held underneath, as the insect is crafty withal, and will drop to the ground on very little provocation; in which annoying "dodge," however, it is surpassed by the larger Cryptocephali, which roll over and escape if merely looked at. In very hot sunshine the Rhynchites sometimes unfurls its wings very rapidly and flies away, even during the short journey from the tree to the net. They appear to bite half through the tender stems of the hazel, about a couple of inches from the young terminal leaves, which shortly wither and hang down, as if damaged by the beating-stick of a collector; and in or upon these apparently unprofitable shoots a male and female will generally be detected. When no beetles are found the last leaf is curled up tight with a large oblong yellow egg in it. Having never observed more than one egg at a time I presume the female deposits on several shoots of the same or different bushes.—*E. C. Rye;* 284, *King's Road, Chelsea.—From the 'Intelligencer.'*

Hints to Bug Collectors.—As the promised Catalogue of the British Hemiptera cannot fail of giving an impetus to bug collecting, the following remarks may not be altogether useless, or considered out of place. At this period, and for some time to come, the collector will meet with numbers of undeveloped forms, which, if consigned at once to the laurel-bottle will be obviously useless as specimens, while if they are returned to the bough from which they were beaten or shaken, the chances are that when wanted they will not be forthcoming, or, in other words, that the collector will never meet with them again,—that is, in the case of species at all rare or scarce. What then is the course to be pursued? The plan I have adopted, and which I recommend to others, is to carry, in addition to the bottle containing bruised laurel leaves, one containing unbruised oak-leaves, if I am beating oak; sprigs of fir, if beating firs; birch, if beating birch, &c. Into this bottle I put all the immature specimens I am desirous of seing become matured. At home I have a large aquarium-glass, to which I have had a leno cover made; in this glass are placed three or four short, squat, wide-

mouthed bottles containing water, in which I put sprigs from the trees off which my specimens were beaten. Here the insects live and thrive as well as they could possibly do in their native haunts, care of course being taken not to allow the plants upon which they feed to wither or dry up, but to renew them as often as they exhibit a tendency to do so; and as a few hours sun every day seems not only to be mightily enjoyed by the insects, but also doubtless greatly favours their development, it would be well to give them the benefit of it, in which case the plants should be changed on removing the glass into the shade. Although they draw much of their nourishment from the young and tender leaves of a plant, they appear to give the preference to the blossoms when they can gain access to them. I find maple in flower very attractive, but less so than oaks, which are now absolutely swarming with several species. So complete a metamorphosis takes place in some of the species that the colour and markings of an immature specimen are no guide whatever in determining what the insect will be like when matured. To-day you may observe a specimen of an uniform bright rosy pink colour, body and wings and all; to-morrow it will be found to have thrown off this livery and made its appearance in a sober suit of olive-green and black with just a reddish or yellowish tinge on the scutellum and a silvery patch at the tip of the wing. —*S. Stone; June* 2, 1860.—*Id.*

On the Transformation of Lymnophlæus marmoratus.—When the pupa of this species is about to undergo its final change it quits the pupa-case, which is composed of silk and small shells, or little bits of sticks or rushes cut into short lengths and arranged transversely; this case is left at the bottom, or, as it may happen, amongst weeds floating on the surface, but those from which my observations were taken were at the bottom of my aquarium, so that I had a full view of the creatures' proceedings. When it first quits the pupa-case the antennæ are folded back, but are soon outstretched, and, as it were, feeling its way through the water. Only four of its six legs are to be observed when it first quits the pupa-case; these are the anterior and intermediate pair. The posterior pair cannot be seen, as they are folded back beneath the body. This appears to differ from the observations recorded in 'Westwood's Modern Classification,' in reference to Hydropsyche atomaria, *Pict.*, but the generic characters and habits of the two may make all the difference. In the species under consideration the intermediate legs are used as natatorial, and not the posterior; this can only be seen when the creature is really shaking off its shroud of a pupa-skin, and as this becomes ruptured along the back the posterior legs are observed being drawn out from beneath the body. The intermediate or natatorial legs are furnished with long ciliæ to enable it to propel itself through the water from the bottom upwards to some plant where it can entirely rid itself of its skin. When the pupa has reached some leaf, while yet beneath the water, it appears to rest for awhile; the abdomen at the same time is kept in constant motion up and down. The pupal envelope or skin is much inflated round the abdomen, and seems only to be attached to the animal at the apex and the minute tubes leading to the trachea. These tubes are distinctly seen through the transparent pupal skin, and are darker in colour. The apical portion of the wing-cases are free, not as those of the Lepidoptera, attached to the sides of the pupa-case; the free apices are a great assistance to the insect when moving through the water. In this way, at every stroke of the natatorial legs, the creature is propelled forwards, but from its gravity being heavier than the element in which it moves would fall back again. These free apices, at every relaxation of the swimming legs, spread out and prevent the creature falling back, so that it is enabled to reach the surface. The antennæ, which were free

when the pupa was moving through the water, becomes attached to the skin; each of these organs is laid along the back on either side the dorsal surface, before the final change takes place. The creature remains stationary for some little time; at length an uneasiness is observed with slight convulsions, and a small rupture is seen at the vertex of the eyes, and gradually the skin parts along the back, and Lymnophlæus marmoratus is seen merging into new life. The imago of this species is very variable in its coloration; those which I have bred have scarcely any colour, being almost white and transparent; others, again, are highly coloured; but this species may always be distinguished by the anastomasis being dark brown, nearly black: this is a very permanent feature in its specific character.—*Edward Parfitt; Museum, Taunton, July* 3, 1860.

Expansion of the Wings in Lepidoptera on Emerging from the Chrysalis.—For the last few years I have amused myself with observing the development of insect life, and amongst other facts that have presented themselves I have been struck with the anxiety evinced by Lepidoptera, on emerging from the chrysalis, to find some suitable object to climb upon. If nothing is near they will run frantically about in all directions, and nothing but absolute exhaustion causes them to cease their exertions. Should they meet with a suitable resting place, as a piece of wood, a tree or a wall, they begin to ascend, and having reached a position which suits them, at once compose themselves to rest and wait the expansion of their wings, which takes place in a most marvellous manner, and in a remarkably short space of time. Having at an early period observed this particular instinct, I have always provided some suitable contrivance for the accommodation of those moths or butterflies the pupæ of which I might happen to possess, and I have scarcely if ever had a cripple; others are not always so fortunate. Last year a friend of mine had a considerable number of pupæ of Smerinthus Populi, which he had reared from an early stage of existence. They were kept in a pan of earth covered with a bell glass, the sides of which the moths could not climb. As they emerged every one was crippled in the wings until I suggested setting up on the earth under the glass a triangle of three pieces of firewood tied together at the top, that the insects might follow their natural instinct; it was done, and from that time all the moths were perfect, having properly developed wings. We constantly hear of collectors and breeders of moths and butterflies being disappointed in the result of the pains they have taken during many weeks or months. by the production of crippled insects, more especially in the case of the large moths, as Acherontia Atropos. Is it not probable that this disappointment is due to the absence of that proper support which the Author of their being has rendered necessary for them at this critical stage of their existence? Observe a moth or butterfly on its emergence from the chrysalis, and you will see that its wings only exist as four little flaps of something soft and thick, as much like bits of coloured velvet as anything else; if you prick them with a needle nearly the whole of the juices or blood of the insect flows from the puncture, showing how delicate is their condition, and what an active state of vitality exists in the organs which in an hour after may be punctured with impunity; hence the anxiety of the creature to be securely located as speedily as possible, with the wings in a pendent position, in order that the fluid with which they are charged may the more speedily and certainly perform its function. — *Henry Deane; Clapham Common, August* 20, 1860.

Proceedings of Societies.

Entomological Society.

August 6, 1860.—J. W. Douglas, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'Catalogues of Natural History Collections in the British Museum,' *viz.* Lepidoptera, Part 1 (Papilio); Hymenoptera, Parts 1 and 2 (Chalcidites); Hymenoptera, Parts 1—7; Diptera, Parts 1—7; Homoptera, Parts 1—4, and Supplement; Hemiptera, Parts 1 and 2; Orthoptera, Part 1; Nomenclature of Coleoptera, Parts 3, 4 and 6; Coleoptera, Parts 7—9; Coleoptera of Madeira; Coleoptera, Part 1 (Cucuijdæ); Hispidæ; Neuroptera, Parts 1—4; Neuroptera, Part 1 (Termitina); British Animals, Parts 5—17; British Hymenoptera, Part 1; British Fossorial Hymenoptera; British Ichneumonidæ; British Curculionidæ; British Diatomaceæ; Marine Polyzoa, Parts 1 and 2; Lepidoptera Heterocera, Part 20. 'Proceedings of the Royal Society,' vol. x. No. 39; presented by the Society. 'Journal of the Proceedings of the Linnean Society,' Supplement to vol. iv. (Zoology); by the Society. 'Proceedings of the Royal Physical Society of Edinburgh,' vol. i.; by the Society. 'Catalogue of British Coleoptera,' Sheets K and L; by the Author, G. R. Waterhouse, Esq. 'Exotic Buterflies,' Part 35; by W. W. Saunders, Esq. 'The Zoologist' for August; by the Editor. 'The Athenæum' for July; by the Editor. 'The Journal of the Society of Arts' for July; by the Society. 'The Natural History of the Tineina,' vol. v.; 'The Entomologist's Weekly Intelligencer,' Nos. 192—200; by H. T. Stainton, Esq. 'Linnæa Entomologica,' vol. xiv.; by the Entomological Society of Stettin.

Exhibitions.

The President exhibited specimens of Stathmopoda pedella, one of the Tineina hitherto so extremely rare in our collections that only two or three examples were known. He found it in abundance in July in the foliage of alder trees at Lewisham, and other persons had also taken it there, so that more than 200 specimens had been captured. Professor Bohemann had recently informed him that this moth was not scarce in Sweden, but he was not aware that the larva had been observed since Linneus wrote of it, "Habitat in Alni foliis subcutanea." It was to be hoped that with this guide to its habits no long time would now elapse before the larva would be re-discovered. The President called attention to the peculiar position in which the spinose hind legs were held in repose—turned under the wings and extended laterally in front of them—a peculiarity which had been noticed by Linneus. Even when the moth walked, these legs were rarely put down, so that the creature usually walked about by means of its other four legs only.

The President also exhibited a specimen of Phloiotrya rufipes, found dead under the bark of an old oak at Leatherhead Common.

Mr. Bond exhibited specimens of a Trochilium, recently taken by Mr. G. King at Torquay; and also some examples of apparently the same species from the collection of J. R. Hind, Esq., captured in Spain, and labelled Philanthiforme.

The species taken by Mr. King, as far as can be ascertained from the damaged

condition of his specimens, appears to be the S. Muscæformis of Esper, originally recorded as a British species by Mr. Newman, in his "Monographia Ægeriarum Angliæ" (Ent. Mag. vol. i. p. 79), on the authority of a specimen in the collection of Mr. J. F. Stephens; the species was also given as British by Mr. Stephens in the Appendix to his 'Illustrations' (Haust. iv. p. 385), on the authority of the same specimen, which, however, he subsequently considered to be merely a variety of S. Ichneumoniformis, and placed it as such in his 'Catalogue of British Lepidoptera in the Collection of the British Museum' (Part 5, p. 31). This specimen (now contained in the collection of the British Museum) is unquestionably a damaged example of S. Ichneumoniformis.

Mr. Janson exhibited three unrecorded species of British Coleoptera, recently taken by Charles Turner at Rannoch, Perthshire, and made the following observations respecting them:—

Rhopalodontus perforatus, Gyll. *Cis perforatus*, Gyll. Ins Suec. iii. 385, 7 (1813). *Rhopalodontus perforatus*, Mellié, Annales de la Soc. Ent. de France, Ser. 2, vi. 234, tab. 9, fig. 23 (1848).—The first indigenous example of this pretty little insect which came under my notice I obtained from the late James Foxcroft, mixed up with some scores of Cis nitidus, reared during the winter of 1853-4, from a hard woody boletus he found on the trunks of old birch trees in the Black Forest, Perthshire, and which, remarking that it was perforated by innumerable minute coleopterous larvæ, he brought up with him to London the previous autumn. Turner, who carefully examined the specimen, and to whom I pointed out its most obvious distinctive characters and communicated its history, has succeeded in securing upwards of thirty examples.

Rhagonycha elongata, Fallen. *Cantharis elongata*, Fallen, Mon. Canth. i. ii. 8 (1807); Gyll. Ins. Suec. i. 335, 8 (1808). Nearly allied to Rhagonycha paludosa, *Fallen*, *Gyll.*, exhibited by me at our last meeting, but readily distinguished from it by its superior size, relatively narrower from the pale basal joints of its antennæ, pale apex of its femora and base of its tibiæ, and its subquadrate prothorax, of which the posterior angles are salient. Gyllenhal and Sahlberg inform us that this species "habitat in frondibus abietis." Zetterstedt remarks that it occurs likewise on birch "in Betuletis Nordlandiæ et Finmarkiæ;" from Turner, who is far from communicative touching his craft, all the information I can elicit is that he "got it in a very strange way."

Brachonyx indigena, Herbst. *Curculio indigena*, Herbst, Natur. Syst. Col. vi. 170, 130, tab. 71, fig. 12 (1793?). *Rhynchaenus indigena*, Gyll. Ins. Suec. iii. 71, 7 (1813). *Brachonyx indigena*, Schoenh. Curc. Disp. Meth. 232, 132 (1826); Gen. et Spec. Curc. iii. i. 329, 214 (1836); Guérin, Icon. Ins. 145, tab. 38, fig. 3 (1833?).—This species is found, according to Gyllenhal and other continental authorities, "in Pini Sylvestris frondibus." Turner, to whom I sent instructions to search for it on this tree, asserts he beat it from birch. Although of not unfrequent occurrence in Sweden, Finland, Lapland, and in the mountainous districts of central Europe, it would appear to be exceedingly rare in Scotland, as Turner assures me that every effort on his part had yielded three examples only, one of which is unfortunately mutilated.

Mr. Waring exhibited two fine specimens of Acidalia rubricata, and a beautiful female of Lithostege nivearia, taken near Brandon, Suffolk, during the present season.

Mr. Scott exhibited the following Lepidoptera:—

Coleophora binotapennella. Bred from larvæ found two years ago at Brighton.

Tinea caprimulgella. Found on the trunk of a tree in Blackheath Park.

Ephestia semirufa, Haw. Found abundantly near Lewisham, as also the variety rufa described by Haworth as a species. Mr. Doubleday informed Mr. Douglas that he had seen no specimens of this insect since he received it from Mr. Dale many years ago.

Mr. Scott also exhibited the following Coleoptera :—

Deleaster Dichrous, Grav. Taken at Crwmlyn, Monmouthshire. June.

Stilicus fragilis, Grav. Taken at Crwmlyn, Monmouthshire. June.

Clythra 3-dentata Found at Darenth Wood.

Mr. Mitford exhibited a beautiful series, including both sexes, of Nemotois cupriacella, lately caught at Hampstead : though the female of this species has been frequently taken in various parts of England, the male had not previously been captured.

Mr. Miller exhibited a number of interesting Micro-Lepidoptera, including an apparently new species of Coleophora bred from larvæ which fed on hazel, and a Lithocolletis, the larva of which mined in leaves of the plum tree.

Mr. F. Walker exhibited a remarkable variety of Lasiommata Megæra, and made the following observations respecting it :—

This singular variety of L. Megæra, if it had been found in a distant region, would perhaps have been considered to be a distinct species. It was taken by my son in Guernsey. The upper surface somewhat resembles that of L. Clymenus, a Russian species, and in the band of the fore wings of the male not being forked it approaches L. Tegelius from Corsica. The most decided peculiarity is in the under side of the hind wings, and it appears to differ as much from L. Megæra as the latter does from L. Mæra and L. Mæroides, *Boisd.*, found in Hindostan ; this last species hardly differs from L. Mæra. Examples in the British Museum of L. Megæra from Persia in no wise differ from the European specimens.

Mr. Waterhouse exhibited specimens of the Cychramus fungicola of Heer and Erichson, an insect which he believed had been commonly confounded in this country with the C. luteus. The C. fungicola, however, might be distinguished by its more convex form, stronger punctuation, less dense and coarser pubescence, and, usually by the disc of the elytron being clouded with brown.

A series of C. luteus was exhibited, with the C. fungicola for comparison. Mr. Waterhouse stated that he believed both species were equally common, and that he had taken them both at Darenth Wood, Birch Wood and Erith. He here observed that the second species of Byturus (*viz.*, B. fumatus) he had this year found both at Darenth and Birch Woods; that at the time he first called attention to the existence of B. fumatus in England, he was not aware of the localities of the very few specimens which came under his notice. The B. fumatus he was aware had been taken by other entomologists in the London district; he had seen specimens captured by Mr. Douglas and Mr. Stokes.

Mr. Waterhouse then exhibited specimens of two species of Ceuthorhynchus, which had to be added to our list of British Coleoptera. The first was the C. Syrites of Germar, Gyllenhal and Schönherr. The specimens exhibited were found by sweeping in the field opposite the inn at Birch Wood Corner, on the 11th of July last, and he had taken a single specimen at Erith on the 26th of June last.

The C. Syrites is nearly allied to C. assimilis, but may be distinguished by its shorter and more convex form, the larger size of the white scales (which are very dense, and form a white line along the suture), with which it is clothed, the somewhat coarser

sculpturing, and, lastly, by the apical third of the elytra being covered with minute tubercles, both on the upper surface and sides. Formerly another species of Ceuthorhyncus had been mistaken for the C. Syrites, *viz.*, the C. inaffectatus of Schönherr, a more oblong and more depressed insect, readily distinguished by its femora being dentate, on which account it is placed in a separate section.

The other species exhibited was the C. tarsalis, of which Mr. Waterhouse had taken specimens at Erith, on June 26th, by sweeping. It was found in company with C. sulcicollis, which it much resembles. Like that insect it has a patch of pale (either yellowish or almost white) scales on the sides of the chest, at the angle between the thorax and elytra, but its form is more elongate and depressed, and, instead of being dull black above, it is somewhat glossy, especially the elytra, which, moreover, have a slight metallic tint, usually of a bronze hue. In its form it more nearly approaches the C. cyaneipennis, from which it may be distinguished by its dark colouring, and the pale patch of scales already alluded to, and from both the species named it differs in having pale testaceous tarsi.

Mr. Waterhouse then proceeded to observe that Mr. Walton, having prepared a Catalogue of the British Curculionidæ for the British Museum, and all the desiderata of the Museum British collection being marked in this Catalogue, he, with his well-known liberality and public spirit, then presented to the public a series of all the species which were desiderata to the Museum, including the unique specimens. Among these specimens thus presented are two British specimens of a Ceutorhynchus bearing the name "tarsalis;" there is, also presented by the same gentleman, a third insect with the same name, this last having been received by Mr. Walton from Germar. With Germar's specimen the insect exhibited by me as C. tarsalis agrees perfectly, as it does likewise with Schönherr's description, but when compared with Mr. Walton's two specimens I notice differences which lead me to doubt if they be the same species; they want the metallic gloss on the elytra, are rather more convex, the striæ of the elytra are rather more strongly marked, and the interstices are more strongly rugulose; moreover, the tubercles at the apex of the elytra are much less distinct. I cannot help thinking that the two insects in question will prove to be varieties of the C. sulcicollis, in which the tarsi are piceo-rufous instead of black. It seems to me probable that Mr. Walton had some doubts of this identification, and hence did not introduce the species C. tarsalis into his list. An insect which appeared to me to agree with Mr. Walton's I now exhibit: it certainly is a very rare circumstance for C. sulcicollis to have the tarsi ferruginous; for I have examined an immense number of specimens, and this is the only one I have seen, with the exception of the two specimens in the Museum already alluded to.

Mr. Waterhouse also exhibited a specimen of Trox hispidus of Laichart, and likewise a specimen of Crioceris dodecastigma of Panzer, both of which he had reason to believe were English; he knew not the locality of either, and his object was to call attention to these insects, through which he thought it possible to learn some definite localities for them.

Of these insects he has possessed a specimen of each for years; they were given to him by his friends, and were supposed both by him and them to be the nearly allied British species, *viz.*, Trox sabulosus and Crioceris 12-punctata. The Trox Mr. W. had long back separated from sabulosus, but could not identify with any description, but recently Dr. Power brought to him for identification a species which appeared to him distinct from others. With this Mr. W. was able to satisfy himself that Dr.

Power's insect is the Trox hispidus of Laichart, and that his own insect is a variety of the same, in which the thorax is very sparingly punctured, whereas it should be rather thickly punctured. The species is readily distinguished by the alternate rows of smaller and larger tubercles on the elytra.

The Crioceris dodecastigma, which has until quite recently been confounded in his collection (never having been looked at probably since it was received), is distinguished from C. 12-punctata by the legs and under parts of the body being entirely black, instead of red. The orbit of the eye is also entirely black, and the antennæ are less stout, &c.

Mr. Rye exhibited a specimen of Deleaster dichrous, taken in a house at Glasgow; a female of Odontæus mobilicornis, from Darenth Wood; and a singular male example of Rhynchites betuleti, destitute of the usual spines on the thorax.

Mr. Westwood exhibited some examples of the pupæ of Papilio Machaon, received from Dr. Verloren, and detailed some experiments by him, proving that the well-known diversity of colour in the pupæ of this species is not indicative of the sexes, or of any variation in the colours of the imago.

Natural Cross Breeding in Bees.

Mr. Tegetmeier described a series of experiments he had been making recently to ascertain whether there existed any natural means for preventing continued interbreeding in the honey bee. He stated that his own experience, as a breeder of several varieties of vertebrate animals, was that continued interbreeding led to deterioration of size, great delicacy of constitution, and ultimately to extinction of the race. It had been alleged, in opposition to these views, that continuous interbreeding was not injurious to the bee, the young queens being supposed to be fertilized by the drones of the same hive, bred from the same parent. It is well known that on a stranger worker bee attempting to enter a hive it is at once seized by the guards, and, unless it succeeds in escaping, stung to death. He found that on placing drones captured as they entered one hive at the entrance of another they ran in and were readily received. In order to ascertain whether they ever willingly entered other hives than those from which they emerged he marked them as they flew forth, by dusting them with flour, and observed that about one-third of the whole number flew into other hives on their return. The workers do not appear to distinguish between stranger drones and those of their own hive; in fact the drones seem common to all the hives in an apiary; hence, even supposing a young queen to be always fertilized by the drones inhabiting the hive in which she is reared, continuous interbreeding must of necessity be prevented.

Mr. Tegetmeier also exhibited reared specimens of Apis Ligustrica, from a hive of that species at the Apiary, Muswell Hill, London.

Mr. Westwood read "Remarks on the Effects of Time and Heat in the Development of certain Sphingidæ," being the results of most elaborate observations, by Dr. Verloren, on Sphinx Ligustri and other species.

Mr. Scott read descriptions of four new species of Coleophora, *viz.*, C. Melilotella, C. Artemisiella, C. Ardæpennella and C. politella.

Part 6 of the current volume of the Society's 'Transactions' were announced as published.—*E. S.*

Botanist's Corner.

On the Natural Affinities of Lastrea Thelypteris.—Has the fern usually described as Lastrea Thelypteris been assigned a proper position by our writers on ferns? I was forcibly impressed, on first seeing it in a wild state, with its numerous points of resemblance to the common brake. Many common characters seem to bring the two plants into very close affinity. Each has its creeping rhizome, and a substantial distinction can scarcely be drawn between the marginal line of fruit in Pteris and the almost confluent sori of Thelypteris. The difference appears to me little more than a question of quantity. The venation of their pinnules is identical, except that in the more compound fronds of Pteris the veins are *twice*, instead of once, dichotomously divided, and bearing in mind that the quantity of sori depends on the quantity of veins. The fewer veins in Thelypteris would quite account for the line of fructification being interrupted in it, whilst confluent in Pteris, without the difference being sufficient for a generic distinction. The capsules of each are partly covered by the convolute margins of pinnules and the evanescent nature of the true indusium common to them both. The decided difference between the barren and fertile fronds of Thelypteris would also seem to connect it with Pteris, through the allied genus Allosorus. If botanists object to Mr. Newman's separation of Thelypteris into a distinct genus ('British Ferns,' 3rd edition), I think they should associate it with the genus Pteris rather than Lastrea, and (supposing the order in which Mr. Newman describes the genera is intended to represent their affinities) that his new genus Hemistheum ought to be placed more immediately adjacent to Pteris.—*George Maw; Broseley, July* 20, 1860.

Discovery of Lathyrus tuberosus at Fyfield, near Ongar, Essex.

Lathyrus tuberosus (Tuberous-rooted Vetchling, or Everlasting Pea), *Linn. Sp. Pl.* 1033. *Gerarde's Herbal*, p. 1057. Roots perennial, fibrous, with many large black tubers, penetrating the soil deeply. Stems climbing two or three feet high, four-sided, not winged; leaflets oval, in pairs; stalks many-flowered; flowers a fine rose-colour, with a little of the fragrance of Lathyrus odoratus; blossoms from July to September. Frequent in corn-fields in many parts of Europe, especially in France, Germany and Italy. Said to have been cultivated in Holland for the sake of its tubers, which are edible when boiled.

Gerarde says that it is found in Hampstead Wood, near London, Richmond Heath and Coombe Park, but Babington doubts the correctness of these localities, and at all events no modern botanist has found it there, nor is it mentioned as a British species by Ray or Hudson. The parish of Fyfield is several miles in extent, and the soil is a very strong heavy clay, with a subsoil of calcareous marl. The plant in question is found abundantly in almost every corn-field and hedge-row in the parish, and also in the adjoining one of Willingale Spain, and probably in High Ongar. In some places it is so abundant as to damage the corn, and it has grown in the same fields for the last sixty years, at least according to the testimony of old men living at Fyfield, so that no doubt can exist as to its being a truly wild plant. I suggest that it may be called the "Fyfield Pea."

Norton Mandeville, where Bupleurum falcatum was discovered by me many years since, is in close proximity to Fyfield, and I have since found that plant in a new

locality, at Writtle, four miles from Chelmsford. I may also mention that the very rare Lathyrus hirsutus is found at Nasing, Essex, in a field near the church, growing with Lathyrus sylvestris, L. Aphaca and L. Nissolia, and also the scarcely less rare Vicia bithynica, all in the space of a few square yards.—*Thomas Corder; Kimpton, near Bedford, August* 20, 1860.

[There is a figure of this beautiful plant in Curtis's 'Botanical Magazine,' pl. 111, and Mr. Watson, to whom I communicated the interesting fact of its discovery in Essex, says, "This might reasonably be expected in Essex as a wild plant, subject only to the doubt suggested by so showy a plant having been so long overlooked in a metropolitan county, if aboriginally native. The species is widely spread in Europe. Italy to South Sweden, eastward into Siberia, westward to Denmark, Hanover, Holland, Belgium, West France, on faith of their Floras." Can Mr. Corder dry a few specimens? They will be most acceptable to British botanists.—*Edward Newman.*]

The Dugong: the valuable Medicinal Properties of its Oil in Consumption and various Diseases. By JOHN MCGRIGOR CROFT, Esq., M.D., M.R.C. Physicians, London, late Medical Officer to H.M. Ceylon Rifles in China and Ceylon, and Staff Surgeon to Her Majesty's Forces.

[The talented author of the following observations having placed them in my hands, I have much pleasure in presenting them to the notice of the readers of the 'Zoologist, who will, I am sure, agree with me that so important a discovery in Medico-Zoology ought to be made known as widely as possible.—*Edward Newman*].

THIS species is a native of the Indian Ocean, and principally observed among the islands of the Indian Archipelago and the coast of New Holland. It is frequently seen in considerable numbers on the coast of Ceylon, especially along the northern shore of the island, among the inlets from the Bay of Calpentyn to that part of Ceylon called Adam's Bridge, where the water is still and the seaweeds abundant. These creatures may be observed in troops, feeding, where the ocean is clear, at a depth from three to four fathoms. The position of the mouth in the dugong, and the muscular powers and mobility of the lips, a large, thick and powerful upper lip falling over the lower, and endowed with great muscular power and mobility, enable the animal to seize and drag up its food. The Malays endeavour to capture these phytophagous cetaceans, so also do the aborigines of Australia, the flesh being exceedingly rich, and tasting like veal. Sir James Emerson Tennent, late of Ceylon, saw one of these creatures, which was sent to him at Colombo, in 1847; it had been killed at Manaar, and measured upwards of seven feet in length, but specimens

considerably larger have been taken at Calpentyn. The male and female dugongs are very affectionate to each other, and especially so to their offspring; when the latter is killed, the mother can scarcely be induced to leave her enemies, and falls an easy prey.

The dugong obtains considerable length and size; the outline of the horizontal tail-fin is crescent-shaped, and a large thick upper lip falls over the lower; the skin of the body is thinly set with short prickly bristles; the anterior limbs or flippers are destitute of nails, and the eyes are very small. A short description of these creatures is necessary, and will no doubt be received with satisfaction, considering that eight or ten gallons of oil may be obtained from an ordinary dugong, the extraordinary properties of which I have been, I believe, the first to test in this country. At Brisbane and Moreton Bay, Australia, the natives catch the animal and greedily devour it.

Dr. Hobbs, a medical practitioner at the latter place, had his attention drawn to the oleaginous properties of the dugong, and for some time past prescribed the oil with advantage where he would have advised cod-liver oil.

For the last twelve months I have been in possession of the oil for the purpose of testing its value, and submitted it to the analytical opinion of my respected friend, the eminent chemist, Professor Taylor, of Guy's Hospital, who has kindly allowed me to state that he considers the oil "very palatable," in fact agreeable, differing in that one point specially from the best cod-liver oil. Its component proportions are exceedingly harmless, stearine in excess, and it can, in his opinion, be taken, without any ill effects, by the most delicate lady, child or invalid. I have communicated to Professor Taylor the results of the use of this remedy in cases of scrofula and consumption, which has led him to give his opinion that an oil so agreeable, with such results, is decidedly a most valuable and important remedy.

As my object is merely to give temporary information to the public, I shall mention a few facts in confirmation of my statement.

A young lady, aged 17, residing in Harley Street, Portland Place, came under my medical care some time since, at the request of her family. She was a perfect skeleton, complexion extremely fair, light hair, of moderate height; her system was saturated with scrofula, had a hacking cough, and evident dulness on percussion, over the apex of the right lung particularly, also slighter over the left. Stethoscopic diagnosis inferred tubercular deposit in these portions of the lungs; scrofulous enlargement of the cervical glands on the right side of the neck, and tumours of the same about the wrist joints; added to all

this, a scrofulous abscess, communicating with the head of the left tibia, or large bone of the leg, at the knee joint. A more unpromising case I never took in hand. It appears she has had the most eminent advice for the last three years, but nothing did good; the best cod-liver oil, vaunted as a "specific," was too nauseous, and, though tried, of no service. She therefore, with slight preliminary treatment and regulated diet, commenced to take the dugong oil in small doses, increasing gradually; the oil being agreeable required nothing to disguise it, and, to use her own words, after taking a few doses she felt sure she should be benefitted by it. In all cases I carefully weigh the patient, and the result in this young lady was one quarter of a pound increase after taking small doses the first week. Every week after, on increasing the dose of oil, her weight multiplied, and at the end of two and a half months she had gained six pounds and a quarter, looked plump, complexion healthy, with clear bloom on cheeks, scarcely any cough, tumours softer and smaller, less discharge from the abscess at the knee joint, able to get out and walk well,—in fact her family were quite surprised at the decided improvement. She still continues the oil without the slightest repugnance, and this remarkable amendment is the result of taking a pint and a half of the dugong oil. This case is highly satisfactory, having watched her with great interest, and I have her family's permission to make this statement. She will in the course of a short time be a healthy, stout young person.

Through the kindness of Sir John Forbes, M.D., Physician Extraordinary to His Royal Highness Prince Albert, Physician in Ordinary to Her Majesty's household, and Consulting Physician to the extensive Hospital for Consumption, at Brompton,—also with the friendly assistance of R. Payne Cotton, Esq., M.D., Visiting Physician of the Hospital—I was permitted to choose a patient in their establishment for the trial of the oil, and Dr. Cotton kindly undertook to observe all my suggestions in the use of the same.

The case was one considered very suitable by the Physicians, and having diagnosced the patient (a male), the medical gentlemen present agreed with me that it was a serious case of advanced consumption. The symptoms were constant cough, with purulent expectoration tinged with blood, great difficulty of breathing, profuse night perspiration, and diarrhœa. The poor man was much emaciated, and evidently could not last long in his present state. Some time before coming under my treatment he had tried the best cod-liver oil, but found it too nauseous, and, he remarked, did him no good. The patient was weighed, and placed on a certain class of diet. He did not know at

at first the kind of oil administered; this was concealed from him, that his imagination might not create a false idea of its effects. The results of the use of the oil after the first week astonished the medical men. "Increase of weight, less difficulty of breathing, bloody expectoration checked, scarcely any profuse perspiration, diarrhœa stopped, appetite better; in fact, the results of the treatment were already apparent." He expressed his satisfaction in taking "some oil" that agreed with him. Each week, for a month, I visited him, and after taking a bottleful of oil, the results of improvement were so evident — especially in weight, less cough, healthy complexion and colour; in fact, a great amendment on the first report for the better—that, to use Dr. Cotton's own words in a letter to me, no one was more astonished at the results of the treatment than the poor fellow himself. I need not remark that the patient, from the interest taken in his case, was aware of something being tried, and he begged to be allowed to shake hands and thank me for what had been done. This is also a very satisfactory result of the use of the dugong oil.

I could state many other cases, but those mentioned are sufficient. Not only in consumption has the oil proved beneficial, but in cases of chronic dyspepsia with frequent constipation, or oftentimes accompanied with frequent diarrhœa, has this remedy proved valuable. Young females particularly seem to benefit from it, and several persons who have resided in tropical climes, with the digestive organs impaired, or suffering from chronic dysentery, have derived great benefit where nothing else seemed of use. I would particularly point out that diet in this treatment is an all-necessary adjunct, and I may add that a long residence in Oriental and Australian lands, in Her Majesty's service, has afforded me that experience which is denied the resident physicians of England.

J. McGrigor Croft.

Mandarin Villa, 8, Abbey Road,
St. John's Wood, January, 1860.

A Mole taking to the Water.—An acquaintance of mine was lately walking by the side of the river Taw, near here, and observed a mole swimming across the river: he could not credit it at first, and waited until it arrived at the side. A boy was at the other side, who got the mole and attempted to throw it across, but did not succeed, and the poor thing made another, but this time ineffectual, attempt to reach the shore, and was drowned. My friend then got it out, to make sure that it was a mole, which it proved to be.—*Edward Parfitt; Museum, Taunton, August* 20, 1860.

Indigenous and Occasional Visitors to the Avi-Fauna of Europe.—I have read the remarks of Mr. Alfred Newton, in the 'Zoologist' for August (Zool. 7145), upon the increasing lists of European birds, from the occasional appearance of the inhabitants of other quarters of the globe, and will, with your permission, offer one or two observations upon this interesting subject. I think it will be admitted by all naturalists that the task of making out a truly indigenous list of the Fauna of Europe is one of extreme difficulty; and I do not think such a list, as applied to birds (to which I now confine myself), would meet the requirements of ornithologists. The object of defining the lists of birds belonging to any country is two-fold: *first*, it is intended to illustrate by these lists those birds which, as far as can be determined, are peculiar to that country—those that live and breed there; but, *secondly*, it is equally important for the student to know something about those which are occasionally seen there. A bird which is observed once will be eagerly looked out for again, and will not be unfrequently found. Upon very good authority I introduced into my work upon the 'Birds of Europe' Regulus calendulus of North America, which was captured in the Scottish Highlands; and, while the sheets were in the press, I heard of a second example which had been taken by a pitman in Durham, and which came into the possession of Mr. Tristram in the flesh. It is only a few years ago that its congener Regulus ignicapillus was discovered by Mr. Jenyns in the mouth of his cat, and the publication of this fact led to the discovery that the bird was a regular inhabitant of the country. This, I think, illustrates sufficiently well the propriety of including in our European or British lists all birds that are even occasionally found in one area or the other. The scientific naturalist, or even the early student, will readily separate the two classes of birds, and thus, while no harm is really done to scientific precision, additional knowledge is diffused, and we have the benefit of seeing and hearing of forms which would be otherwise shut up in Audubon's splendid folios or other works of the kind. It thus appears to me that it is absolutely essential to adopt in our lists the rule which all really good ornithologists have followed, whether Temminck, Schlegel, Bonaparte or Selby or Yarrell in our own country. The lists speak clearly what they mean, if characterised by a mark like that of the 'Zoologist List of British Birds,' and I think the readers of historic works upon the subject will not be ungrateful to their authors for the additional trouble and expense by which they are made acquainted with new forms, which it is quite possible they may again meet with in their naturalists' rambles. Larus ichthyætus, or even Falco leucocephalus may again be found wandering either into Russia or Great Britain, and we shall be none the worse for the additional knowledge by which we shall be enabled to welcome them as familiar friends.—*C. R. Bree; Colchester, August* 6, 1860.

Kestrel feeding Chickens.—I had known that the master of the Cirencester Union kept a female kestrel, which was usually at liberty in one of the yards, and having for her companion a jackdaw; last year she laid, on the straw in her box, two eggs, one of them of the ordinary shape and colouring, the other more oblong and the colour paler, but much darker at the large end: I have these eggs, which, on shaking them, seem to contain a fluid. At the end of last month a hen hatched a brood of chickens, she being confined in a coop, the little ones running, as usual, in or out of the cage, as they pleased. One day the master of the Union gave the hawk a piece of raw meat, and was much astonished to see her run off immediately towards the coop, and draw away the young chickens, which she, in the kindest and most attentive manner, began to feed, by tearing the meat in pieces and presenting it to their bills, as

she would have done to her own young; but the chicks did not seem to comprehend well her intention at first, generally preferring to pick up the meat from the ground, the hawk scattering it about her. One delicate chick seems to receive more attention from the hawk, and keeps closer to her, receiving a larger portion of food. The gentle and affectionate manner in which the hawk presents the morsels of meat to the young birds is most pleasing to witness: at first she will hold up the whole piece of meat to the chicks, which, I presume, is intended to draw them off to a distance from the hen, who at first was greatly alarmed at seeing her young ones in such dangerous company. One morning the hawk seemed to have devised a method to appease the hen, for on being fed she ran off straight to the coop with the piece of meat in her bill, and presented it to the hen, as if to say, "See here, I am only going to feed your young ones with this," and suiting her actions to her words fed them at a short distance off; since then the hen has appeared perfectly satisfied. One morning I saw the hawk scratching the ground and shaking her wings as a hen does when she wishes to gather her little ones under them, and I think that it was really the motive of the hawk to draw them around or under her. An account somewhat similar is related by Yarrell of the buzzard; but I do not learn that the kestrel sat on her own eggs, which she laid last year. It will be seen that the period in which these fond attentions have been paid to the young of another bird is considerably later than usual, the young of the kestrel being hatched about the end of March or beginning of April.—*Joshua Brown; Bartonbury, August* 4, 1860.

Robins and Titmice reared in one Nest.—A short time ago, when looking for bird's nests, I discovered a robin's in a hole, about five feet from the ground, in a chestnut tree; the nest contained five eggs. Being the first I had found this summer, I determined in a day or two to take one egg. The third or fourth day after I first found the nest I went to the tree; to my great surprise, I saw some very fine hair and wool close to the mouth of the hole inside; I just peeped in, and out flew a blue titmouse. How the ingenious and impudent little fellow had become possessed of the robins' chosen place I cannot conceive. I only saw the robins once after. The bold titmouse very soon returned, and in a few days had deposited eggs amongst the robins. As soon as it began to sit, I hollowed out a piece of stick and took two robin's and three titmouse's eggs out of the nest; there were left six tits and three robins. In due time the eggs were hatched, and the old tits tended the robins the same as their own. One morning I thought they would be ready to fly, and I got a lighted taper and inserted into the hole; to my surprise, they were all flown but one little tit,—in about an hour afterwards it was gone as well. I then got the nest out as well as I could, and found one robin's egg left, so that two robins and six titmice were all reared in one nest.—*L. Appleby; Middleton Lodge, July* 29, 1860.

The Hawfinch breeding in Norfolk.—In the 'Zoologist' for 1846 (Zool. 4946), I recorded the first instance that had ever come to my notice of the hawfinch remaining to breed in this county, at which time a young bird, now in my possession, was shot in Kimberley Park. On the 20th of July last I was shown an immature specimen, obtained at Easton a few days before, much resembling my own, but if anything rather more advanced in plumage. I am more and more convinced, from inquiries made of gamekeepers, gardeners and others employed in likely haunts for these shy birds, that these two are by no means solitary instances of the hawfinch nesting in this county, although their peculiar watchfulness and the dense foliage they usually frequent render it extremely difficult to detect their presence amongst us, except in

such accidental cases as the above. After the unusual number of these birds that appeared in this district during the winter and spring of 1859-60, being met with as late as the middle of April, the wonder is rather that several nests have not been taken than that one solitary nestling should attest the probability of many more undiscovered.—*H. Stevenson; Norwich, August* 16, 1860.

Snipes in Summer.—On the 9th of this month a friend of mine was sent to me to say there were hundreds of snipes on the moors: these so-called "Moors" are a long, low, marshy tract below Bridgwater, and, from this dull wet season, have been pretty well covered with water. My friend and an acquaintance went, and lo and behold! there were hundreds of snipes; and they were told that if they had been there a day before they might have seen many more: however, as it was, notwithstanding the difficulty of getting about, from the quantity of water, they did pretty well. The two gentlemen killed seven brace, which were in capital condition. Now the question is, From whence came these snipes—the veritable Scolopax gallinago? They were evidently migrating somewhere, as they stopped so short a time. The record of their appearance at other places would be interesting, to shew their line of route; we might then possibly see to where they were bound.—*Edward Parfitt; Museum, Taunton, August* 20, 1860.

Great Flocks of Scoters in July.—I was at the mouth of the Ribble on the 7th of July, and, to my great astonishment, saw several very large flocks of scoters; in all there must have been over a thousand. They were exceedingly shy, and would hardly let the yacht come within two or three hundred yards. There were amongst them several velvet ducks, easily distinguished by their size and the white on their wings. Where could all these birds have bred, so as to be here so early. There are always a few to be seen almost all through the year, but I never recollect seeing such large flocks so early. I shot one bird, evidently a young one, but whether it was a common scoter or velvet duck I could not decide. The beak was very broad and black, and all the plumage black, except the neck and the lower part of the head, which was dusky brown.—*E. C. Buxton; Daresbury Hall, Warrington, August* 4, 1860.

Abundance of the Common Lizard (Zootoca vivipara) *in Ireland.*—If you consider the following fact worthy a place in the 'Zoologist' it is much at your service: it is interesting as opposed to the opinion of naturalists and others, that reptiles do not inhabit Ireland. In the month of June last the common lizard (*Zootoca vivipara*) was to be found in vast numbers everywhere in the county of Down. They were most varied both in size and colour; in size varying from one inch to four inches in length, and in colour from pale fawn to jet-black. What renders this circumstance more remarkable is that they never occurred here before, excepting a single individual at a time, and those at long intervals.—*F. Bewley, Clerk; Laurencetown, Co. Down, July* 25, 1860.

Unusual Modes of Gestation in Batrachians and Fishes.

Among Batrachians the circumstances under which the young are developed, though less varied than in some of the other classes of vertebrates, still present a considerable range. By most species the eggs are deposited in the water, either upon aquatic plants or on the bottoms; by others, as in Salamandra erythronota, they are laid in damp places under logs or stones; with some the evolution of the embryo commences a short time previous to the laying of the egg, and is completed subsequently, while there are species which are wholly viviparous. The most remarkable deviations from the ordinary modes are to be found in those instances in which the eggs, after being laid, are again brought into a more or less intimate relation with the parent, as in the "swamp toads" (*Pipa Americana*) of Guiana, where each ovum is developed in a sac by itself on the back of the female, in Notodelphys of Venezuela, where all the eggs are lodged in one large sac also on the back, analogous to the pouch of the marsupials, and in Alytes, the "obstetric toad" of Europe, where the eggs are wound in strings around the legs of the male, who takes care of them until they hatch.

The species, the habits of which are noticed below, and which, in so far as I have been able to learn, have not attracted the attention of naturalists, adds another to the series just mentioned, though the relation of the fœtus to the parent becomes less intimate than in any of the preceding cases.

Hylodes lineatus, *Dum. and Bib.*, is very common in Dutch Guiana, and its peculiar habits are well known to the colonists. The first specimen with young which came to my notice had been preserved in alcohol, and was presented to me by Mr. G. O. Wacker, residing at Otembo, on the Para Creek, Surinam, and had been captured at some distance from the water. The young, ten or twelve in number, though separated from the parent, he assured me, when found were attached to the back. In the month of May, 1857, during an excursion to the country inhabited by the Bush negroes, above Sara Creek on the upper Surinam River, I had an opportunity for the first time of seeing these animals carrying their young. The grass and bushes were quite wet from a recent fall of rain, and this seemed the inducement that led them from their hiding places, for when the ground was dry none had been seen. They were very quick in their movements, and when

alarmed went at once into the grass and thick bushes. One of my companions, Mr. John Green, and myself succeeded in capturing some specimens, which, as we were just leaving the village, were placed at once in alcohol. In one instance the larvæ were retained permanently adherent to the back of the parent, in consequence of the coagulation of the mucus covering the surface of the body, and are still preserved in the Museum of Comparative Anatomy at Cambridge. The young, from twelve to twenty in number, were collected upon the back of the mother, their heads directed towards the middle line: they were about three-fourths of an inch in length. No limbs were developed, though in some of them the rudiments of a leg existed in the form of a small papilla on either side of the base of the tail. No especial organ was found to aid them in adhering to the back of the parent; the adhesion may have been effected by the mouth. This is rendered probable by the fact that all of them had the mouth in contact either with the skin of the parent or with that of another larva. A viscid mucus covering the integuments undoubtedly assisted in some measure to bring about the same results. However this may be, they retained their places perfectly well, and were not displaced when their mother, closely pursued, carried them through the grass.

On dissection of the young nothing was found materially different to conditions of the larvæ of other Anoura. The external gills had disappeared, but were replaced by internal ones, which were arranged as usual on three hyoid arches. The development of the lungs had commenced, and these were represented by a slender conical mass of cells, but not permeable to air. The mouth was provided with finely denticulated horny jaws, and the intestinal canal was shorter and less spirally convoluted than in ordinary larvæ of frogs and toads. The stomach was not so much developed as to be distinguished from the rest of the intestine; but this last, after passing the liver, was somewhat dilated, and contained, as was shown by the microscope, large quantities of yelk-cells which had not been absorbed, and which were adherent to its walls.

We have here, then, a larva, in all the details of its structure, especially in the existence of gills and of a flattened tail, adapted to aquatic locomotion and respiration, yet passing a portion of its time at least on the back of its parent, and at a distance from the water.

I was not able to ascertain whether the eggs were primarily deposited in the water or not, but it is well known to some of the colonists that after the larvæ have reached a certain degree of development they are carried about in the manner just described, and they do not

know them under any other circumstances. The existence of yelk-cells in the intestine shows that for a period at least they may have from these a supply of nutriment; but after this is exhausted—and it appeared to be nearly so in those which I have dissected—how do they obtain their food? In the absence of limbs adapted to terrestrial locomotion can they leave the body of the parent? And if they cannot, do they, as in the case of Pipa, and probably in Notodelphys, depend upon a secretion from her?

Among fishes, as far as at present known, the external conditions under which the eggs are developed are more varied than in any other class of vertebrates. There are scarcely any known conditions of the higher classes to which there are not analogies, at least in the class of fishes. Besides the ordinary mode of depositing eggs upon the bottoms some of the Salmonidæ, like the turtles, bury their eggs; the lampreys (*Petromyzon*), the breams (*Pomotis*), the hassars (*Callicthys*), the sticklebacks (*Gasterosteus*), &c., build more or less complete nests.

Among some of the pipe fishes (*Syngnathidæ*) the eggs, and subsequently the young, are carried in a pouch analagous to that of the opossums and other marsupial animals; and among some of the sharks there is a vitelline placenta analogous to the allantoidan, one of the Mammalia.

To those species enumerated above, where the eggs become more or less intimately connected with the body of the parent after they are laid, may be added the Aspredos, and some species of Bagrus, from Guiana.

Aspredo lævis (*Cuv.* and *Val.*), the "Trompetti" of the colonists, is about fifteen inches in length, and belongs to a remarkable genus of Siluroid fishes, which, in addition to several peculiarities of anatomical structure, are remarkable for carrying the eggs and young attached to the under surface of the body. These fishes are very abundant in the waters of the Surinam, where they are taken in the nets with other kinds. They are not used as articles of food, except by the negroes, who have a fancy for Siluroids generally, and in consequence these are known among the colonists as Ningré fisi, or "nigger fish." A general account of the internal structure of Aspredo is given in the 'Histoire Naturelle des Poissons,' by Cuvier and Valencienne.

In the month of June the eggs are found adhering to the under side of the body, to the ventral and pectoral fins, and extend as far forward as the under lip, and as far backwards as the middle of the tail. In some, however, the distribution is much more limited. I

was unable to learn anything with regard to the transfer of the ova from the genital orifice to the point of their attachment. The only organ which seems in any way adapted to such a purpose is the slender and flexible tail, terminated by a delicate caudal fin. It is possible that the eggs may be deposited on the bottom of the river, and subsequently attached by pressing the under side of the body upon them.

In those individuals where the ova were still in the ovary, but approaching maturity, the integuments of the under side of the body gave no other indications of the changes about to take place than of being quite vascular; the skin was perfectly smooth, no "pores" were visible, but a large vessel was seen emerging from the region of the liver, and, descending along the median line, gave off branches quite freely to the integuments. This may have some relation to the future development of the pedicles which support the eggs, and perhaps to the nutrition of the embryo, as will be adverted to hereafter.

In all the specimens which I have had an opportunity of examining the eggs were either somewhat advanced or quite mature; so that no observations could be made on the earlier conditions of the egg and the formation of its pedicle. The pedicle is a flexible outgrowth from the common integuments, is about two lines in length, is attached to the skin by a slightly expanded base, and spreads out at its summit into a shallow cup or "cupule" for the support of the egg. It is composed almost entirely of fibrous tissue, invested with a layer of tessellated epithelium. In some instances, when the eggs were but little advanced, numerous fusiform cells were detected among the fibres. It is vascular, two or three vessels reaching to the cup, where they ramify and form a somewhat extended capillary plexus.

The eggs vary according to the degree of development, from the 0·09 to 0·15 of an inch in diameter, and are covered with an external homogeneous membrane, containing minute punctiform depressions; within this is a second, of a brownish colour, and composed of epithelium. The embryos which were the most advanced, and just ready to hatch, had not as yet completely absorbed the yolk, and were coiled up within the membranes, which, in consequence of the irregularities of the mass formed by the embryo, had no longer a spherical form.

The eggs are retained in connexion with the cup apparently by adhesion alone, for as soon as the fœtus escapes the egg-membranes become very easily detached from the pedicle, and this last, as shown by some of the specimens, undergoes absorption.

The relation of the embryo to the parent in this singular mode of gestation cannot be determined very accurately, but the vascular plexus in the cup seems to be more than is necessary for the mere nutrition of the part. This increases in size during incubation, those ova in which the development had but slightly advanced measuring from 0·09 to 0·11 of an inch in diameter, while those nearly mature measured from 0·14 to 0·15 of an inch. How this increase of size of the embryo over the original size of the egg is actually obtained I have no facts to show, but either of two suppositions is probable: it may be by absorption of materials from the water which surrounds it, or from the capillary plexus of the pedicles, and in this case in a manner analogous to that of Pipa.

Among the Siluroid fishes of Guiana there are several species which at certain seasons of the year have their mouths and branchial cavities filled either with eggs or young, and, as is believed, for the purpose of incubation. My attention was first called to this singular habit by the late Dr. Francis W. Cragin, formerly U.S. Consul at Paramaribo, Surinam. In a letter dated August, 1854, he says, "The eggs you will receive are from another fish. The different fishermen have repeatedly assured me that these eggs, in their nearly mature state, are carried in the mouth of the parent till the young are relieved by the bursting of the sac. Do you either know or believe this to be so, and, if possible, where are the eggs conceived, and how do they get into the mouth?"

In the month of April, 1857, on visiting the market of Paramaribo, I found that this statement, which at first seemed to be very improbable, was correct as to the existence of eggs in the mouths of several species of fish. In a tray of fish which a negro woman offered for sale I found the mouths of several filled with either eggs or young, and subsequently an abundance of opportunities occurred for repeating the observation. The kinds most commonly known to the colonists, especially to the negroes, are Jara-bakka, Njinge-njinge, Koepira, Makrede, and one or two others, all belonging either to the genus Bagrus or one nearly allied to it. The first two are quite common in the market, and I have seen many specimens of them; for the last two I have the authority of negro fishermen, but have never seen them myself. The eggs in my collection are of three different sizes, indicating so many species; one of the three having been brought to me without the fish from which they were taken.

The eggs become quite large before they leave the ovaries, and are arranged in three zones corresponding to three successive broods, and

probably to be discharged in three successive years; the mature eggs of a Jara-bakka eighteen inches long measure three-fourths of an inch in diameter, those of the second zone one-fourth, and those of the third, or very minute, about one-sixteenth of an inch.

A careful examination of eight specimens of Njinge-njinge, about nine inches long, gave the following results.

The eggs in all instances were carried in the mouths of the males. This protection, or gestation of the eggs by the males, corresponds with what has been long noticed with regard to other fishes, as for example Syngnathus, where the marsupial pouch for the eggs or young is found in the males only; and Gasterosteus, where the male constructs the nest, and protects the eggs, during incubation, from the voracity of the females.

In some individuals the eggs had been recently laid, in others they were hatched, and the fœtus had grown at the expense of some other food than that derived from the yelk, as this last was not proportionally diminished in size, and the fœtus weighed more than the undeveloped egg. The number of eggs contained in the mouth was between twenty and thirty. The mouth and branchial cavities were very much distended, rounding out and distorting the whole hyoid and branchiostegal region. Some of the eggs even partially protruded from the month. The ova were not bruised or torn as if they had been bitten, or forcibly held by the teeth. In many instances the fœtuses were still alive, though the parent had been dead for many hours.

No young or eggs were found in the stomach, although the mouth was crammed to its fullest capacity.

The above observations apply to Njinge-njinge. With regard to Jara-bakka, I had but few opportunities for dissection, but in several instances the same conditions of the eggs were noticed as above; and in one instance, besides some nearly mature fœtuses contained in the mouth, two or three were squeezed apparently from the stomach, but not bearing any marks of violence or of the action of the gastric fluid. It is probable that these found their way into that last cavity after death, in consequence of the relaxation of the sphincter which separates the cavities of the mouth and stomach. These facts lead to a conclusion that this is a mouth-gestation, as the eggs are found there in all stages of development, and even for some time after they are hatched.

The question will be very naturally asked, how, under such circumstances, these fishes are able to secure and swallow their food. I

have made no observations bearing upon such a question. Unless the food consists of very minute particles, it would seem necessary that, during the time of feeding, the eggs should be disgorged. If this supposition be correct, it would give a very probable explanation of the only fact which might be considered at variance with the conclusion stated above, viz., that we have in these fishes a mouth-gestation. In the mass of eggs with which the mouth is filled I have occasionally found the eggs, rarely more than one or two, of another species. The only way in which their presence may be accounted for, it seems to me, is by the supposition that while feeding, the eggs are disgorged; and as these fishes are gregarious in their habits, when the ova are recovered the stray egg of another species may be introduced into the mouth among those which naturally belong there.*

Musical Fishes of the East.

THE existence of musical fishes is as firmly believed by residents in various parts of our eastern empire as that of sea serpents by those whose home is on the waters of the great deep. I desire to encourage both beliefs, and demand that respectful credence shall be given to respectable witnesses. At the same time I thoroughly commend, and indeed enjoin, that caution which carefully sifts evidence, and admits no more than is clearly demonstrated. Dr. Buist has lately collected some very interesting paragraphs on the subject of the musical fishes of the East, and published them in No. 1711 of the 'Athenæum,' dated August 11, 1860. These I reprint below.

The first is from Sir Emerson Tennent's 'Ceylon,' and the phenomenon described was heard at Chilka Lake, a salt water creek close to Batticaloa, on the eastern shores of Ceylon. It is as follows:—

After speaking of these musical fishes Sir Emerson Tennent says, "I distinctly heard the sounds in question. They came up from the water like the gentle thrills of a musical chord, or the faint vibrations of a wine glass when its rim is rubbed by a wet finger. It was not one sustained note, but a multitude of tiny sounds, each clear and distinct in itself; the sweetest treble mingling with the lowest bass. On applying the ear to the wood-work of the boat, the vibration was

* Extracted from the 'Canadian Naturalist and Geologist,' Vol. v. No. 3.

greatly increased in volume by conduction. The sounds varied considerably at different points, as we moved across the lake, as if the number of the animals from which they proceeded was greatest in particular spots ; and occasionally we rowed out of hearing of them altogether, until, on returning to the original locality, the sounds were at once renewed."

The next extract is particularly interesting as relating to a different locality, and as having been published as far back as January, 1847 in the ' Bombay Times.' The place mentioned is a salt-water creek near Bombay. There is no collusion whatever between the two writers. It is extremely improbable that Sir Emerson should have seen this account, and have omitted all allusion to it ; and it is quite impossible that Dr. Buist should have been cognizant of Sir Emerson Tennent's subsequently published observations. Here is Dr. Buist's own narrative :—

" A party lately crossing from the promontory in Salsette called the ' Neat's tongue,' to near Sewree, were, about sunset, struck by hearing long distinct sounds like the protracted booming of a distant bell, the dying cadence of an Æolian harp, the note of a pitch-pipe or pitch-fork, or any other long-drawn-out musical note. It was, at first, supposed to be music from Parell floating at intervals on the breeze ; then it was perceived to come from all directions, almost in equal strength, and to arise from the surface of the water all around the vessel. The boatmen at once intimated that the sounds were produced by fish, abounding in the muddy creeks and shoals around Bombay and Salsette ; they were perfectly well known, and very often heard. Accordingly, on inclining the ear towards the surface of the water ; or, better still, by placing it close to the planks of the vessel, the notes appeared loud and distinct, and followed each other in constant succession. The boatmen next day produced specimens of the fish — a creature closely resembling in size and shape the fresh-water perch of the north of Europe—and spoke of them as plentiful and perfectly well known. It is hoped they may be procured alive, and the means afforded of determining how the musical sounds are produced and emitted, with other particulars of interest supposed new in Ichthyology. We shall be thankful to receive from our readers any information they can give us in regard to a phenomenon which does not appear to have been heretofore noticed, and which cannot fail to attract the attention of the naturalist. Of the perfect accuracy with which the singular facts above related have been given no doubt will be entertained when it is mentioned that the writer was one of a party of five intelligent persons,

by all of whom they were most carefully observed, and the impressions of all of whom in regard to them were uniform. It is supposed that the fish are confined to particular localities — shallows, estuaries and muddy creeks, rarely visited by Europeans; and that this is the reason why hitherto no mention, so far as we know, has been made of the peculiarity in any work on Natural History."

I should observe that these observations date but one year previously to those of Sir Emerson Tennent's, who was at Chilka late in 1848, eleven years before the publication of his work on Ceylon. But we have other independent witnesses. In 1858 the present Governor of Ceylon visited Chilka Lake, and this, be it observed, is a year prior to the publication of the fact by Sir Emerson Tennent. This gentleman says,

"I ought not to take my leave of Batticaloa, which I may not have an opportunity of revisiting, without mentioning the natural phenomenon for which its lake is remarkable—the singing fish. I was too ill during my stay in 1857 to expose myself in the night air upon the water; and I confess that, in spite of the impression then made upon my fellow travellers, amongst whom were Major-General Lockyer and Captain Gosset, I went out upon the present occasion with a considerable amount of incredulity, and was the last to believe the evidence of my own senses, Dr. Johnston being satisfied as to the existence of a sound apparently proceeding from the water long before I could realize it; but after changing the position of the boat once or twice, there could be no doubt about the matter. The sound rose and swelled, and absolutely vibrated about us in a manner that left no question as to the fact, whatever may be the causes. Its character is indescribable. It is not like any other sound. It is only heard at night. It has nothing harmonious or musical about it. There are no modulations, no variety of notes, except what the increase and decrease in strength produced. As to its origin, nobody knows anything. It may be the fish to whom it is popularly attributed; it may be the rush of air through rocks partially hollowed. There is nothing but conjecture to guide us in this respect. The results all can vouch for. And these results are certainly most distinct within a limited distance from the shore, though heard occasionally in deep water. I am no naturalist; I can only state what I personally saw and experienced. Others must explain it. Something similar, it is said, occurs in the Bay of Naples. It is strange that between Naples and Batticaloa there should be this one point of resemblance."

Next follows an extract from a letter published in the 'Bombay

Times' a few weeks subsequently to the publication of his first notice in the same journal.

"*Musical Fish.*—Sir,—In a late number of the 'Times' I noticed some remarks respecting the musical fish as they have been rather aptly termed; and it may be interesting to the readers of the 'Times' to be informed that the existence of a similar phenomenon has long been known to the residents at Vizagapatam. I have heard the musical sounds, like prolonged notes on a harp, when rowing at the back water at that station; and they were generally supposed to proceed from the fish coming in contact with the sides of the boat. To the best of my recollection the sounds were never heard at a distance from it." Vizagapatam is on the Coromandel coast, 498 miles from Madras, the shores abounding in shallow creeks like those of Ceylon.

The last extract is from the 'Journal of the Samarang,' and written by Dr. Adams, surgeon and naturalist to the expedition.

"While on board the brig 'Ariel,' then lying off the mouth of the river of Borneo, I had the good fortune to hear that solemn aquatic concert of the far-famed organ fish or drum — a species of Pogonias. These singular fishes produce a loud monotonous singing sound, which rises and falls and sometimes dies away, or assumes a very low drumming character; and the noise appeared to proceed mysteriously from the bottom of the vessel. This strange submarine chorus of fishes continued to amuse us for about a quarter of an hour, when the music, if so it may be called, suddenly ceased, probably on the dispersion of the band of performers."

These various narratives, too diversified to be repetitions of each other, too similar to be mere inventions independent of each other, contain intrinsic evidence of truthfulness, quite irrespective of that credence to which the position of the several writers so eminently entitles them. I entertain no shadow of doubt that the phenomenon has been faithfully recorded in the true spirit which Natural History requires and generates. Nevertheless, the mind is naturally slow at receiving facts opposed to the ordinary evidence of our senses. The belief that fishes are dumb has become of universal acceptance; but waiving this accepted creed, what is the character of that sound? If vocal, where are the organs of voice situated? If not vocal, by what other process are these musical sounds produced? I shall be extremely obliged for communications on this most interesting subject.

EDWARD NEWMAN.

Notices of New Books.

'*The Ibis: a Magazine of General Ornithology.*' Edited by Philip Lutley Sclater, M.A., F.L.S., &c. Nos. 5, 6 and 7; respectively 104 pp., 98 pp., and 108 pp.; and two or three coloured litho. plates. London: Trübner. January, April and July, 1860. Price 6*s.* each.

The general character of this Journal is fully explained in a former number of the 'Zoologist' (Zool. 6946). I have now only to give a summary of the contents of the three numbers:—

Contents of No. 5.

Notes on Birds observed in the Ionian Islands, and the Provinces of Albania proper, Epirus, Acarnania and Montenegro. By the Hon. Thomas L. Powys, F.Z.S.

On Birds collected or observed in the Republic of Honduras, with a short account of a journey across that country from the Pacific to the Atlantic Ocean. By George Cavendish Taylor, F.R.G.S. Part I.

On the Eggs of two Raptorial Birds from the Falkland Islands. By Philip Lutley Sclater.

Note on Wallace's Standard-wing (*Semioptera Wallacei*). By Philip Lutley Sclater.

Contributions to the Ornithology of Guatemala. By Osbert Salvin and Philip Lutley Sclater.

The Ornithology of Amoy (China). By Robert Swinhoe, of H.M. Consular Service.

On the Ornithology of Northern Africa. By the Rev. H. B. Tristram, M.A., F.L.S. Part III. The Sahara (continued).

Note on the Migratory Habits of the Song Thrush (*Turdus musicus*). By Alfred Newton, M.A., F.L.S.

Contents of No. 6.

On the addition to the British Fauna of Pallas's Three-toed Sand-grouse (*Syrrhaptes paradoxus*). By Thomas John Moore, Keeper of the Free Public and Derby Museum, Liverpool.

On Birds collected or observed in the Republic of Honduras, with a short account of a journey across that country from the Pacific to the Atlantic Ocean. By George Cavendish Taylor, F.R.G.S. Part II.

On the Nidification of certain Birds in North-eastern Africa. By Baron Richard König von Warthausen.

Additions and Corrections to the 'Ornithology of Amoy.' By Robert Swinhoe, of H.M. Consular Service.

Notes on Birds observed in the Ionian Islands, and the Provinces of Albania proper, Epirus, Acarnania and Montenegro. Part II. By the Hon. Thomas L. Powys, F.Z.S.

The Ornithology of Northern Celebes. By Alfred Russell Wallace.

On an undescribed Species of Hawk from New Granada. By Philip Lutley Sclater.

On the Ornithology of Northern Africa. By the Rev. H. B. Tristram, M.A., F.L.S., C.M.Z.S. Part IV. Lake Halloula.

Ornithological Notes of the Voyage of the 'Fox' in the Arctic Seas. By David Walker, M.D., late Naturalist on board the 'Fox.'

On the Eggs of the Nutcracker and Parrot Crossbill. By the Rev. H. B. Tristram, M.A., F.L.S.

Note on the Eggs of the Eared Vulture and the Wedgetailed Eagle. By J. H. Gurney, M.P., F.Z.S.

Memoir of the late John Wolley.

Contents of No. 7.

On Birds collected in the Colony of Natal, in South-eastern Africa. By John Henry Gurney, M.P., F.Z.S.

On Birds collected or observed in the Republic of Honduras, with a short account of a journey across that country from the Pacific to the Atlantic Ocean. By G. Cavendish Taylor, F.R.G.S. Part III.

Notes on Birds observed in the Ionian Islands, and the Provinces of Albania proper, Epirus, Acarnania and Montenegro. By the Hon. Thomas L. Powys, F.Z.S. Part III.

On the Habits of the Swallowtailed Kite (*Elanoïdes furcatus*). By Robert Owen, C.M.Z.S.

On Birds collected in the Somáli country, Eastern Africa. By Captain J. H. Speke, F.R.G.S.

History of the Derbyan Mountain Pheasant (*Oreophasis Derbianus*). By Osbert Salvin, M.A., F.Z.S.

Recollections of the Swans and Geese of Hudson's Bay. By George Barnston.

Notes on the Humming Birds of Guatemala. By Osbert Salvin, M.A., F.Z.S.

Contributions to the Ornithology of Guatemala. By Osbert Salvin and Philip Lutley Sclater. Part II.

Note on the Egg and Nestling of the Californian Vulture. By Philip Lutley Sclater.

Ornithological Notes from Mesolonghi and Southern Ætolia. By W. K. Simpson, M.A., F.Z.S.

Each number also contains notices of recent ornithological works, and extracts from correspondence. The character of the work is fully maintained in these three quarterly parts.

Natural History versus *Geography and Others: a Plea in a Great Cause.* By the Rev. Hugh A. Stowell, M.A.

In this day and generation of ours, when popular education is the fashionable mania (I say it not disparagingly), and when Science and Art are with more or less success attempted to be popularised by so many and often by so gifted minds and pens, is it not matter for surprise and regret that Natural History as a branch of national education should have found so few advocates compared with the other "graphies" and "ologies" that it has been almost excluded from the all-embracing scheme of the Committee of Privy Council?

For the large majority of the pupils of our national schools, much that they learn—we may take Geography as a by no means extreme example—can never have any practical use beyond the general expansion it may give to their minds. Now surely the study of Natural History would produce this effect in at least an equal degree, while at the same time it possesses this great advantage in addition, that it would generally prove far more attractive, and would therefore be more heartily taken up and more readily remembered than most of the subjects now taught in our schools. That this last is a point of no small importance, all who have witnessed how much is usually forgotten, and how soon after leaving school, will be ready to admit.

Moreover, my own experience, so far as it has gone, convinces me that, educate as you will, you will never make the mass of our rural population readers, unless indeed a radical change in the circumstances of their daily life shall at some future time give an external impulse to their minds. Taken from school at a very early age,—obliged to toil from dawn till almost dark under the soporific influence of the open air,—their homes too often comfortless and lacking the needful privacy,—and above all wanting themselves in a great measure the sharpening contact one with another which a busy town affords,—their work solitary and their dwellings far apart,—is it, I ask, reasonable to expect that they will acquire a taste for habitual reading of any kind?

Yet while experience, backed by reason, leads me to despair of making this class readers, it only confirms my belief that they may be made observers—close and rational observers. Thus it is by calling forth and stimulating and training their powers of observation that it seems to me you have the best chance of expanding and elevating their minds; and for this purpose what means so effectual as the study

of Natural History can be proposed? But in order to secure the desired end Nature must not be "got up" from books, technically and scientifically, and committed to memory as a task, but rather read in her own simple though sublime language, and studied in her own pleasant way, which, by appealing persuasively at once to the senses and to the higher faculties, is sure to make a deeper and more lasting impression on the mind and memory than the mere "rote" system. This is only to be accomplished by lessons on objects. I would have every teacher able to take his or her pupils out into the lanes and fields and woods, and there to open up to them the beautiful workings of God in Nature, which are of necessity secrets hidden from, or at best mysteries dimly revealed to, the untaught eye. The wondrous unfolding of the flowers from seed to fruit,—their hidden uses to man,—the curious forms of insect life they nourish, each one its own,—the mysterious powers of seeming sensibility wherewith some of them are endowed,—the remarkable adaptation of others to their peculiar circumstances of soil and climate,—the many minute testimonies they one and all bear to the wisdom and goodness of their and our Creator;—in this branch of Natural History alone is there not endless matter for useful lessons, and would they not prove as interesting as useful? Then, again, a little trouble in collecting a few specimens, and a small outlay for a microscope, what a vast store of interest and instruction would they provide against the rainy days of winter!

When the children thus taught come to leave school, *there* are the books they have learnt to read and to love all around them—in the fields turned up by the ploughshare, in the hedges laid bare by the bill, by the highways and by-ways as they go to work, in their gardens and at their doors when their day's work is done. The great volume is open before them always and everywhere—open to the very poorest "without money and without price"—open to the most wearied and toil-worn without a long walk to the library to fetch it. How then can they help reading from it, if once its language has been interpreted and become familiar to them? And reading, how can they help being interested—reflecting—improving their minds? True the same volume is open to the untaught, but how open? Just as a book that you may set before an infant; it may see the letters, it may crow over the pictures; but it understands nought of it. Or as a child just beginning to spell may tell over every letter upon the page, and even syllable them all, but yet is none the wiser for them.

So is it with him who, untaught in his younger days, sees a great

deal of what Nature is doing around him, and perhaps feels a sort of admiration of it at times, and it may be even goes further still, and compares some two or three of the things he has seen in his mind; nevertheless he cannot comprehend them; he knows not the why and wherefore of them, nor even what they mean. Of course he is comparatively uninterested, and most of what he sees is lost upon him. It merely passes before his eyes and over his mind without leaving a trace behind.

It may seem a piece of unwarrantable presumption in one who freely acknowledges his comparatively limited experience to speak thus confidently on a subject of such transcendent importance as that of education, but feeling strongly on this point it is my earnest desire to aid, in however lowly degree, in calling that attention to the subject which it surely deserves, but has certainly not hitherto received.

May I be permitted, in conclusion, to express my fervent hope and trust that the day is not very far distant in which the Sacred Volume of Nature—every letter of it, remember, bearing the autograph Divine—will no longer be allowed to remain a sealed book to any village scholar in Great Britain. Then many a poor labourer will go forth to his daily toil cheered by its glorious utterances written in his head and on his heart, while its ever open pages invite him to a fresh lesson of love from day to day, to his great and endless benefit, and to his Creator's higher glory.

HUGH A. STOWELL.

Christ Church, Manghold, Isle of Man,
August 31, 1860.

Zoological Phenomena.—The reader will please observe that the proprietor of the 'Zoologist' receives nothing for the advertisements reprinted below. They are preserved as literary curiosities, and are valuable as bearing conclusive evidence to the state of Natural History education in 1791 and 1860. There must be a public attracted by such advertisements, the advertisers being too wise in their generation to pay so dearly for their love of fun.

The Greatest Living Curiosi'y in Europe.

MR. BROADBENT has received instructions to SELL BY AUCTION, on Monday next, July 30, 1860, at one o'clock, at the London Hotel, Bridge-street, the ZEBU BULL, that was taken from Nana Sahib and his followers the night after the siege of Lucknow. This extraordinary animal contains five distinct and pure breeds—firstly, the head of the calf; secondly, the legs of the antelope; thirdly, the feet of the deer; fourthly, the hump of the camel; and fifthly, the tail and hind quarters of the lion. It also possesses the extraordinary faculty of moving its horns at pleasure. To noblemen, gentlemen, zoologists and others, the above animal is especially recommended to their notice. On view morning of sale.—*From the 'Manchester Courier' of July* 4, 1860.

The Wombwell of the last Century.—Copied *verbatim et literatim* from the 'Kentish Gazette' of December 16, 1791.

MR. FOSCO'S Collection of WILD BEASTS — from various parts of the world. To be seen at the Cattle-market without St. George's gate, Canterbury, every lawful day from 10 o'clock in the morning till night.

This curious collection was shown before His Majesty, and all the Royal Family, the Duke of Montagu, Lords Chesterfield, Courtney and Sidney, and a great number of the nobility, at Weymouth, the 16th day of July, 1789.

I. The Noble Hunting TYGER from Bengal. II. A Young SEA LION from the Cape of Good Hope. The Keeper is obliged to wash him in water every day. III. Is the ETHIOPIAN SAVAGE, or the HAIRY MAN, 5 feet 3 inches high, and as stout as any person: the only one in the Kingdom. This Wonderful production of Nature has body, breasts, arms, and fingers entirely like a Christian [*Query*, as to the *anatomical* distinction between Christians and Heathens?], and is so sensible as to understand every word the keeper says to him! IV. Is the OURAN-OUTANG or the WILD MAN from the West Indies. V. Is a very curious PORCUPINE. This astonishing creature was bred upon the coast of Barbary: it is half a bird and half a beast; every quill on his body is 18 inches long: when he shoots his quills, he throws them 150 yards from his body: and each quill is as hard as iron. [An able-bodied volunteer that!] VI. Is (*sic*) the MUSCOVITE CATS, a male and female, striped like a Tyger, and spotted like a Leopard, the only two alive in England. VII. Is the JACKALL, or Lion's Provider. This creature goes 5 or 6 miles in the forest to provide for the Lion, and what he cannot carry he will conduct the Lion to. VIII. Is the AMERICAN MONSTER [Legree?]. IX. Is the little JENNY JIP, the Night-walker, 72 years of age. X. The UNKNOWN ANIMAL from BOTANY BAY, brought to England by Captain Lee, in the Ship Rover: the legs are straight and beautiful, and the feet much like a chicken's; its head like a rabbit, and a back like a pig; and has been viewed by some few of the Eminent philosophers in England; but they cannot give the Animal a Name as yet.—And many other animals and birds too tedious to mention.

*** When shown the Birds and Animals are clean, young [this implies a tolerable longevity in the above-mentioned Miss Jane Jip, whoever she may be], and pleasing, adapted to the inspection of Naturalists, and those who admire the Novelties of the Creation. The largest beasts are so secured in iron dens that Ladies and Gentlemen may see them with the greatest safety.—Ladies and Gentlemen 1s.; Tradesmen 6d.; Working People 3d.

☞ Now, Ladies and Gentlemen,—you may have the opportunity of seeing this noble collection of wild Beasts, consisting of the large Sea Lion, the Hunting Tyger, the Chief Justice of the brute creation [their Judge Jeffreys rather], a pair of Muscovy Cats, the young Congrow, the Porcupine, and a number of birds and beasts too tedious to mention.

Migration of Birds.—A year or two ago, happening to be engaged in making a tour in the Mediterranean, and being, on the 21st of April, on board a steam-vessel exactly half way between the Island of Cerigo and Malta, on my way to the latter place, a large number of birds flew on board, evidently performing their annual migration from the coast of Africa. They were principally the common titlark, though among the number were wheatears, a fern owl or two, as well as various swallows; the whole of them seemed much fatigued. Flights of turtle doves passed the ship the whole day; a few alighted for a few minutes in the rigging, but showing no symptoms whatever of exhaustion, and high over head were flocks of vultures or eagles, proceeding as leisurely as rooks of an evening on the way to their roosting-places. Now the distance of the spot I mention from the coast of Africa in two directions is just 240 miles, and, as near as possible, just about as far from the coast of Italy, as well as the Morea. The flight of these birds from land to land, therefore, could not have been less than 480 miles. Many of the titlarks, though in a

state of exhaustion, left the ship, to my astonishment, after a rest of an hour or so only, and proceeded on their journey, flying but a few feet apparently from the surface of the water. The weather at this time was beautifully fine. At Malta, a few days after, a friend who had been at sea about the same time informed me that a flight of the small passerine owl had alighted on board his ship; and in the market I observed quantities of these owls, as well as bee-birds, and a number of common cuckoos, which, it appeared, had been caught at night in the quail-nets. How such a bird as a titlark can perform at a stretch such a journey as a sea voyage of 480 miles is one of the facts far beyond our comprehension, but that they do so my statement is surely sufficient ocular demonstration of.—*From the 'Field' of September* 8, 1860.

Suggestions for forming Collections of Birds' Eggs. By ALFRED NEWTON, Esq., M.A., F.L.S., F.Z.S., &c.*

1. *General Remarks.*

THE collecting of bird's eggs for scientific purposes requires far more discrimination than the collecting of specimens in almost any other branch of Natural History. While the botanist, and generally speaking the zoologist, at home, is satisfied as long as he receives the specimens in good condition, with labels attached giving a few concise particulars of when and where they were obtained, it should be always borne in mind that to the oologist such facts, and even the specimens themselves, are of very slight value unless accompanied by a statement of other circumstances which will carry conviction that the species to which the eggs belong has been accurately identified, and the specimens subsequently carefully authenticated. Consequently precision in the identification of his specimens should be the principal object of an egg-collector, to attain which all others must give way. There are perhaps few districts in the world, and certainly no regions of any extent, whose faunas are so well known that the most rigid identification may be dispensed with. Next to identifying his specimens, the most important duty of an egg-collector is to authenticate them by marking them in some manner and on some regular system as will leave no doubt, as long as they exist, of their having been obtained by him, and of the degree of identification to which they were subjected. Neatness in the mode of emptying the shells of their contents and other similar matters are much to be commended; they render the specimens more fitted for the cabinet. But the main points to be attended to, as being those by which science can alone be benefited, are identification and authentication.

* Reprinted, with additions, from the Circular of the Smithsonian Institution of Washington.

2. *Identification.*

The most satisfactory, and often the simplest, way of identifying the species to which a nest of eggs, when found, belongs, is to obtain one of the parents by shooting, snaring or trapping. But it sometimes, in practice, happens that this is found to be difficult from one cause or another, such as the wary instincts of the birds, or the necessities of his position compelling the traveller to lose no time, or the scarcity of the species making him unwilling to destroy the individuals. In any of these cases there is nothing to be done but to make as careful an examination as circumstances will admit of the precise situation of the nest, the materials of which it is composed (supposing that the collector cannot bring it away with him), and accurately to survey the surrounding locality, to observe by what species it is frequented; all the particulars of which examination and survey should be fully noted down at the earliest opportunity possible. Should, however, either or both the birds be killed, they should be skinned, or at least some characteristic part of each preserved,* and duly labelled to correspond with the inscriptions subsequently put on the eggs, and always with a reference to the collector's journal or note-book, wherein fuller details may be found.

The oologist is especially warned not to be misled by the mere fact of seeing birds around or near the nests. Many of the crow family (*Corvidæ*) are great eaters of eggs, and mistakes are known to have originated from birds of that kind being seen near nests of which they were certainly not the owners. Others, such as the titmice (*Paridæ*), though not plunderers, obtain their food by incessantly seeking it, even in the very localities where many species build. It often happens, also, that two different birds have their nests situated very close to one another; and if they be allied species the collector may be easily deceived. Thus, it has come to the writer's knowledge that the dunlin (*Tringa alpina*) and the purple sandpiper (*Tringa maritima*) have have had their nests only a few feet apart. At first a pair of the latter only were seen, which by their actions betrayed their uneasiness. A short search discovered a nest with four eggs. The observer was one of the best practical oologists then living, and his eye at once saw

* Birds may be preserved entire by simply pouring (through a small funnel) a few drops of pyroligneous acid down their throats, and saturating the feathers, especially about the vent, with the same fluid; after leaving them to dry for an hour or so, they may be wrapped in paper and packed. This fact was kindly communicated to me by Mr. John Hancock, and I have since made successful trial of the plan.

that it was not the nest which he wanted; but a less experienced man would doubtless have immediately concluded that he had found the eggs of the rarer species. Indeed it may, generally speaking, be said of most birds that whenever they have nests of their own they are also acquainted with those of their neighbours, which by their actions they will often betray to the collector who may be patiently watching them. Birds, again, will occasionally lay their eggs—accidentally, as it were—in the nests of other species, even when they are not, as the Old World cuckoos (*Cuculus*, *Eudynamis* and *Oxylophus*) or the cow blackbird (*Molothrus Pecoris*), of a parasitic nature; thus, eggs of the eider duck (*Somateria mollissima*) have been found in the nest of a gull (*Larus*), and other similar cases are on record, in some of which, from the species being nearly allied, confusion might easily have arisen, though at the time no doubt may have occurred in the collector's mind.

It would be impossible in this paper to treat of the various methods which may be successfully employed to obtain the birds to whom a nest belongs, and, in fact, these methods can generally be only learned by experience. It is sufficient to indicate here the use of traps, snares, hingles or bird-lime, in cases where the individuals are too shy to admit of being shot by the gun or rifle. Much may often be gathered by the collector from the practice of the natives, especially if they be savages or half civilized. In like manner it would too much extend these suggestions to give a detailed account of the different ways in which the nests of birds are to be found. The experience of a single season is to most men worth a whole volume that might be written on the subject. Nevertheless, a few hints are given further on, which might not occur to the beginner.

3. *Authentication.*

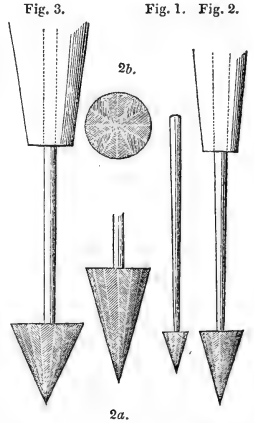
The most complete method of authenticating eggs is that of writing in ink on their shells,* not only the name of the species to which each belongs, but also, as far as the space will admit, as many parti-

* A few possessors of egg-cabinets have a great aversion to specimens which have been written upon in the manner here recommended. With all deference to their example I cannot yield to what I am compelled to consider a prejudice, and a prejudice which may indirectly lead to very mischievous consequences. The neat and ingeniously-prepared tickets or labels which are used by many persons are not of themselves the slightest guarantee for the authenticity of the specimens to which they are affixed, as the process of removal and substitution is one of the easiest imaginable.

culars relating to the amount of identification to which the specimen was subjected, the locality where, date when, and name of the person by whom they were taken, adding always a reference to the journal or note-book of the collector, wherein fuller details may be given. It is advisable to do this on some regular system, and the following method is suggested as one that has already been found to work well in practice. The scientific names only to be used, except with a mark of doubt or within brackets, when the specimens have really been satisfactorily identified; and if the identification has been made by obtaining one or both of the parent birds a memorandum of the fact to be added, thus: "Both birds snared," "Bird shot," or in smaller space, "Bd. st." If the identification has been effected only by obtaining a good view of the birds the fact should be stated thus: "Bird well seen," Bird seen," or "Bd. sn.," as the case may be. For eggs not taken by the collector himself, but brought in by natives, or persons not having a scientific knowledge of Ornithology, the local name or the name applied by the finder should only be used, unless, indeed, it requires interpretation, when the scientific name may be added, but always within brackets, thus: "Tooglee-aiah (*Squatarola helvetica*)," the necessary particulars relating to the capture and identification being added. Eggs found by the collector and not identified by him, but the origin of which he has reason to think he knows; may be inscribed with the common English name of the species to which he refers them; or if it has no such appellation then the scientific name may be used, but in that case always with a note of interrogation (?) after it, or else the words "Not identified." If the collector prefers it, many of these particulars may be inscribed symbolically or in short hand, but never unless the system used has previously been agreed upon with persons at home, and it be known that they have a key to it. Each specimen should bear an inscription; those from the same nest may be inscribed identically; but different nests, especially of the same or nearly allied species, should never be so marked that confusion can possibly arise. It is desirable to mark temporarily with a pencil each egg as it is obtained; but the permanent inscription, which should always be in ink, should be deferred until after the egg has been emptied. The number terminating the inscription in all cases referring to the entry in the collector's note-book, wherein full details will be found, and the words or letters preceding the number serving to distinguish between different collectors, no two of whom ought to employ the same. The initial letter of the collector's name prefixed to the number will often be sufficient.

4. *Description of Egg-blowing Implements.*

Figs. 1, 2 and 3 represent "drills" for making neat and circular holes in the shell. These drills should be made of the best steel that can be procured, and of different sizes. Fig. 1 is meant for the smallest eggs, even humming birds', up to those say of a song thrush (*Turdus musicus*). The grooves forming the drilling surface should be cut with a chisel. Fig. 2 will suit the generality of eggs, excepting those of very large birds and sea-fowl, which usually lay eggs with a strong but soft shell. The grooves may be cut either with a chisel or a file, but if with the latter greater care will be requisite in its use. Fig. 3 is intended for the largest eggs, and even some of the smaller ones which have a chalky shell, such as Crotophaga. The grooves are cut with a file. In the manufacture of all these drills the greatest care is necessary that the grooves should lie parallel to one another, and that their edges should be smooth. The smaller the drill the more acute should be the angle it forms at the point. The drills may be fitted with handles or not according to fancy. Those with handles are less likely than the others to cramp the fingers of the performer, an inconvenience which often causes breakages.



Figs. 1, 2, 3, full size. 2*a*, 2*b*, enlarged.

A separate sketch is given with the enlarged views (figs. 2*a*, 2*b*) of the end of a drill,* in order to show more plainly the manner in which the grooves should be cut.

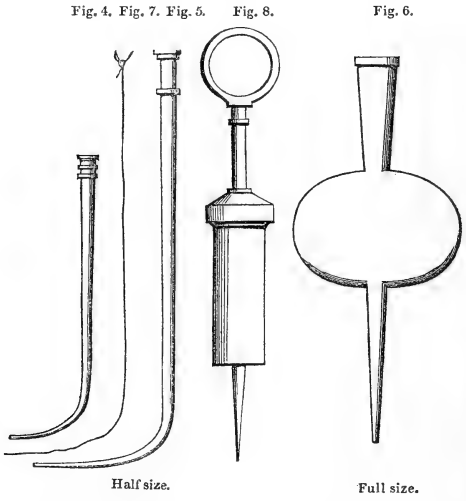
Figs. 4 and 5 represent blowpipes for emptying eggs. They are best made of metal, and for this purpose nickel (or German silver) is preferable, as being less liable to rust. A collector should have two sizes, as a large pipe is not convenient for small eggs, and a small one causes loss of time in blowing large eggs. They should be

* The great object to be attained is the formation of a circular hole with smooth edges. Collectors not having such a drill as is here recommended will find a common nail or a three-cornered needle a useful substitute, but either must be used with extreme care. A rat-tailed file sharpened to a point at the end is also an effective instrument, as I am kindly informed by the Rev. S. C. Malan, who prefers it to the drill recommended in the text.

be made as light as possible, or they may slip from the mouth and break the egg being operated on. The chief point to be attended to in their construction is that the lower orifice should be as large as the size of the pipe permits. It is of course necessary that they should be perfectly smooth outside, towards the lower end.*

Fig. 6 represents a tube for emptying small eggs by suction. The bulb is to receive the contents of the egg and prevent them from reaching the mouth of the operator and thus causing nausea. This instrument is best made of thin glass, as thereby it can be easily kept clean. The same remark applies to this as to the last with respect to the size of the lower orifice.

A piece of thin wire (fig. 7), long enough to pass entirely through the tubes, should be always kept at hand by the operator to remove



obstructions which are likely to occur from small pieces of the embryo or half-dried yelk being accidentally drawn into the tubes or blowpipes.

Fig. 8 represents a syringe, which will be found useful in rinsing out the inside of an egg. It may be made of any metal, though the

* In the absence of a blowpipe, a reed, straw or grass stalk, will be found to be a tolerably efficient substitute.

pewter ones are apt, from their weight, to be clumsy. Nickel is recommended, as for the common blowpipes. The lower orifice should be as large as possible. The ring at the top should be large enough for the insertion of the operator's right thumb — as it must be remembered that he has to work it with one hand.

Figs. 9 and 10 represent scissors of shapes likely to be found very useful; fig. 9. for cutting through the bones of the embryo before it is extracted, and fig. 10 for cutting off portions of it while it is being

Fig. 13. Fig. 12. Fig. 14.

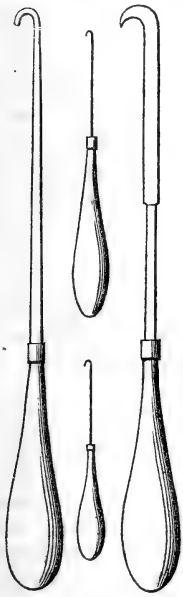
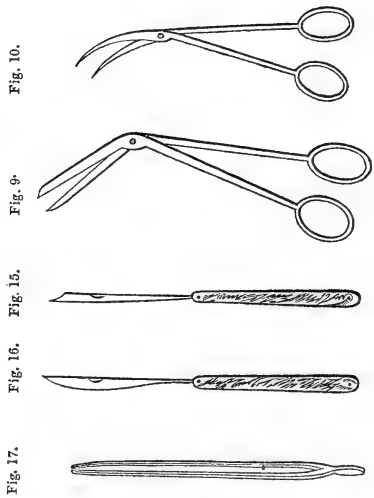


Fig. 11.
Full size.



Half size.

extracted by one of the hooks represented in figs. 11, 12 and 13, which should vary in size from that of an ordinary pin to that of stout wire. The length of their straight portions should be rather more than the diameter of the egg they are used on.

Fig. 14 represents a knife with a curved blade, somewhat like a bill-hook, and may be useful in cutting up the embryo prior to extraction.

Figs. 15 and 16 represent a penknife and scalpel with elongated blades or shafts, to admit of their being introduced into the egg to cut up the embryo. Fig. 15 is also, perhaps, the best instrument with which to remove the lining membrane from the hole. This is done by inserting the blade perpendicularly, and slightly scraping the edge of the hole as soon as it is drilled.

Fig. 17 represents a forceps for extracting the pieces of the embryo when cut up. The spring should not be too lively, as its resiliency may occasion breakage. The grasping surfaces should be roughened to prevent the pieces slipping.*

5. *Preparation of Specimens.*

Eggs are emptied with the least amount of trouble at one hole,† which should be made at the side of the specimens, as shown in the annexed engravings (figs. 18 and 19), with one of the drills already described (figs. 1, 2, 3). The hole should of course be proportioned to the size of the egg and the amount of incubation it has undergone. Eggs that are hard sat upon are more easily blown by being kept a few days, but the operation must not be deferred too long or they are apt to burst violently immediately on being punctured, though this may be avoided by holding them under water while the first incision is made. The hole being drilled, the lining membrane should be cleared away from the orifice with a penknife (fig. 15), by which means not only is the removal of the contents, but also the subsequent cleansing of the

* Most, if not all, of the implements here described may be obtained of any surgical-instrument maker. I have pleasure in mentioning the name of Mr. J. Evrard, of 35, Charles Street, Middlesex Hospital, as that of the workman who for some years past has supplied several of my friends and myself. He fits up neat and convenient pocket-cases with a set of all the most useful tools for egg-blowing and bird-skinning. Mr. David Mackenzie, of 58, South Bridge, Edinburgh, I have been informed, furnishes drills, blowpipes, &c., and at a most reasonable rate. I believe that the Smithsonian Institution of Washington will, with its usual liberality, equip any of its correspondents in America according to their requirements.

† Those who may still prefer to blow eggs by means of two holes are particularly requested not to make them at the ends of the eggs, nor at opposite sides, but on the same side (fig. 20). In this case the hole nearest the smaller end of the egg should be the smallest, and the contents blown out at the other. If the holes are made at the ends of the eggs it not only very much injures their appearance as cabinet specimens, but also prevents their exact dimensions from being ascertained accurately; and if they are made at opposite sides the extent of the "show surface" is thereby lessened.

Fig. 20.

specimen, facilitated. The small end of a blowpipe (figs. 4 and 5) should then be introduced, while the other extremity is applied to the mouth, and blown through, at first very gently. If the embryo is

Fig. 18.

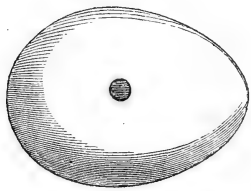
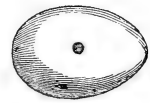


Fig. 19.



found to be moderately developed a stream of water should be introduced by means of a syringe (fig. 8), and the egg then gently shaken, after which the blowpipe may be again resorted to, until by the continued use of both instruments, aided by scissors (figs. 9 and 10), hooks (figs. 11, 12 and 13), knives (figs. 14, 15 and 16), and forceps (fig. 17), the contents are completely emptied. After this the egg should be filled with water from the syringe, gently shaken, and blown out, a process which is to be repeated until its interior is completely cleansed, when it should be laid upon a pad of blotting paper or fine cloth, with the hole downwards, its position on the pad or cloth being occasionally changed until it is perfectly dry. During this time it should be kept as much as possible from the light, especially from the sunshine, as the colours are then more liable to fade than at any subsequent time. In the case of very small eggs, when fresh the contents may be sucked out by means of a bulbed tube (fig. 6), and the interior afterwards rinsed out as before. It is always advisable, as far as possible, to avoid wetting the outside of the shell, as the action of water is apt to remove the "bloom," affect the colour, and in some cases alter the crystallization of the shell; consequently dirt stains or dung spots should never be removed. While emptying the contents it is as well to hold the egg over a basin of water to avoid breakage in case of its slipping from the fingers. Should the yelk of the egg be dried up, a small portion of carbonate of soda may be introduced (but with great care that it does not touch the outer surface of the shell, in which case the colour is likely to be affected), and then the egg filled with water from the syringe, and left to stand a few hours with the hole uppermost, after which the contents are found to be soluble, and are easily removed by the blowpipe, assisted by one of the hooks. It is almost

unnecessary to add, except for the benefit of beginners, that the manipulation of the different instruments requires extreme caution, but a few trials will give the collector the practice necessary for success. Eggs should never be written on until the shells are perfectly dry, or the ink will be found to run, and the inscription will be rendered illegible. Eggs with chalky shells, such as those of the anis (*Crotophaga*), gannets and cormorants (*Pelecanidæ*), and others may be conveniently marked by incising with a pin or the point of an egg-drill, so also those of the ptarmigans (*Lagopus*), care being taken in this case to select the dark-coloured patches to write upon. The inscriptions should always be placed on the same side as the hole or holes, and confined within the smallest limits possible. For drilling the hole or holes the side presenting the least characteristic markings should be selected.

Eggs that are very hard sat upon, of whatever size they be, should be treated in the following manner, which is a method superior to any other known at present to the writer for preventing injury arising to them. The annexed engraving (fig. 21) shows a piece of paper, a number of which when gummed on to an egg, one over the other, and left to dry, strengthen the shell in such a manner that the instruments above described can be introduced through the aperture in the middle and worked to the best advantage, and thus a fully formed embryo may be cut up, and the pieces extracted through a very moderately sized hole; the number of thicknesses required depends of course greatly upon the size of the egg, the length of time it has been incubated, and the stoutness of the shell and the paper. Five or six is the least number that it is safe to use. Each piece should be left to dry before the next is gummed on. The slits in the margin cause them to set pretty smoothly, which will be found very desirable; the aperture in the middle of each may be cut out first, or the whole series of layers may be drilled through when the hole is made in the egg. For convenience sake the papers may be prepared already gummed, and moistened when put on (in the same way that adhesive postage labels are used). Doubtless patches of linen or cotton cloth would answer equally well. When the operation is over a slight application of water (especially if warm) through the syringe will loosen them so that they can be easily removed, and they can be separated from one another and dried to serve another time. The size represented in the sketch is that suitable for an egg of moderate dimension, such as that of a common fowl.

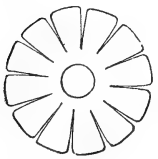


Fig. 21.

The most effectual way of adopting this method of emptying eggs is by using very many layers of thin paper and plenty of thick gum, but this is of course the most tedious; nevertheless it is quite worth the trouble in the case of really rare specimens, and they will be none the worse for operating upon from the delay of a few days, caused by waiting for the gum to dry and harden. The naturalist to whom this method first occurred has found it answer remarkably well in every case that it has been used, from the egg of an eagle to that of a humming bird, and among English oologists it has been generally adopted.

The surest method of packing eggs so as to travel long distances and by rough modes of conveyance without receiving injury is to roll up each specimen separately in tow, flax, wool, or some similar material, so as to form a ball, and then to place these balls side by side in a good stout box, taking care that there be no room for them to shift their position. Those to whom this method may appear too troublesome are recommended first to put a layer of one of the substances just mentioned at the bottom of the box, then a layer of eggs, upon these another layer of packing material, and so on until the box is completely filled. The box should then be shaken, and if any rattling of the contents is heard additional packing material is required. More breakages occur by the use of boxes too large for the number of eggs than the contrary. As a general rule it may be stated that eggs if blown do not break against one another, but against the sides of the box; if unblown, however, their weight renders it necessary to protect them from each other. On the other hand, the surest method of packing eggs so that they may arrive at their journey's end broken is one which, though of course with the contrary intention, has often been recommended, *viz.*, to place them in a box, filling up the interstices between them with bran, sawdust, corn or sand. The effects of this method are in one respect diverse; if the eggs be unblown they will, after sufficient jolting, be found at the bottom, if blown at the top of the box, but in either case the result will be the same, and many be smashed. There is, perhaps, no greater annoyance to an oologist than to receive from a correspondent a lot perhaps of valuable and carefully collected eggs broken through bad packing.

6. *Concluding Observations.*

The best allies of the collector are the residents in the country, whether aboriginal or settlers, and with them he should always endeavour to cultivate a close intimacy, which may be assisted by the offer

of small rewards for the discovery of nests or eggs. He should, however, always insist upon any nests found being shown to him *in situ*, and the gratuities paid should be proportioned to his success in identifying the species to which they belong. He should steadily refuse any but the most trifling remuneration for nests or eggs taken and brought to him. As a rule the eggs of the different species of plovers and sandpipers (*Charadriadæ* and *Scolopacidæ*) are those most wanted by oologists of all countries. These birds mostly breed in high northern latitudes, but they often choose elevated spots for nesting in more southern parallels. Their nests are nearly always difficult to find, even when the birds are discovered. Their habit is, if the ground be at all rough with herbage, to run off the nest for some distance before taking wing as the observer approaches; if the ground be bare they will try to escape observation by squatting closely until they are almost trodden upon. The best method of finding them, and indeed the nests of some other species, is for the collector to conceal himself near the place where he has reason to believe the eggs are, and to endeavour to watch the bird as she returns to her nest—using a telescope if necessary; but should this fail, after giving her time to settle herself upon it, to fire off a gun suddenly, or spring up and shout, when the bird, in her surprise, will often at once take wing from the nest, or at least without running many yards. To reach the nests of rock-building birds a man or boy can be lowered by a rope from the top, when it is accessible. The rope should always be tied under the arms of the person lowered, as substances, detached from above by the friction of the rope, may, by falling on him, stun him for a moment, and cause him to lose his hold. But in all places and at all times an egg-collector should recollect that identification and authentication are his main objects, to attain which no trouble is too laborious, no care too great.

It does not come within the scope of this paper to offer any remarks on the arrangement or method of exhibiting eggs in cabinets. What has been attempted is simply a series of suggestions for collectors in the field. They are especially urged to aid the study of Oology by exercising greater zeal than many have hitherto been wont to do in seeking and recording precise information relative to the specimens they procure, and that at the very time and place when only it may be sought and recorded. It follows of necessity that such information should not be neglected by oologists at home, but carefully entered and preserved in the catalogues of their collections, which all oologists ought to keep. In many cases they may prefer forming these cata-

logues on their own plan; indeed for general collections of eggs they are obliged so to do; but to those who are content with a moderate series of the eggs of British birds only, the useful 'Systematic Catalogue'* of the Rev. S. C. Malan will be found of very great convenience, though the plan recommended by that gentleman, of using tickets to distinguish the specimens instead of writing in ink on their shells, appears to the author, as has been stated above, to be liable to many grave objections. But with the simple substitution of inscriptions for tickets (which are so easily removable) Mr. Malan's method seems deserving of very great commendation, for it is the comparative indelibility of the former which gives them so great an advantage over the latter as permanent records of identification and authentication.

ALFRED NEWTON.

Elveden, Thetford,
July 11, 1860.

Instinct of the Common Partridge.—This season a pair of the common partridge selected the following extraordinary position for a place of incubation,—*i. e.* the top of an old barrel in a yard, at a considerable distance from a field, at Trumpington, Cambridgeshire, where six or seven chicks were duly hatched. Surely this may justly be termed instinct, for no other cause can be assigned than an instinctive foreboding in the parental birds of an approaching season that was likely to prove disastrous to its eggs and young, and has not the past almost unprecedented wet weather proved so, to our cost? Never having met with a similar instinctive propensity in the partridge, I have ventured to send this note for insertion in the 'Zoologist.'—*S. P. Saville; Jesus Terrace, Cambridge.*

Toads waiting for Moths attracted by Sugar.—There is a tree standing by the side of a ditch in the fens, which leans in, three feet and a half from the ground, two inches out of the perpendicular; there is a small hollow place in the stem, one inch deep and two inches wide, all the way from the ground growing wider upwards till it is lost. On this tree, three feet and a half from the ground, I sugar for insects, and several nights a large toad has ascended the tree to the sugar: it always sits quietly on the stem, and I never find it on any other tree, although there are several other trees, all ash. I believe its object is to take the insects that come to the sugar. I have called the men at the railway bridge, which crosses the river near the spot, to

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* 'A Systematic Catalogue of the Eggs of British Birds,' arranged with a view to supersede the use of labels for eggs, by the Rev. S. C. Malan, M.A. London: John Van Voorst, 1, Paternoster Row. 1848. 8vo, pp. 170. Price 8*s.* 6*d.*

see it, and one of the men and his wife saw it the other night, and took it down, but in less than half an hour it was there again; other persons have also seen it; and whenever I sugar the tree it is almost sure to be there. Strange as this may seem, I cannot find any other fact about it, although I have paid a deal of attention to the subject. I never find any insects on the tree if the toad is there. Has any other person met with a similar occurrence?—*William Winter; Aldeby, near Beccles, August* 22, 1860.

[The fact of toads waiting at the foot of a sugared tree for the moths that may happen to fall off in a fit of intoxication has long been familiar to me; but I do not recollect a previous record of a toad climbing a tree with this object. The conjecture that the toads are attracted by the saccharine droppings has been hazarded, but is quite untenable; so is also the idea that Cossus ligniperda frequents the sugared willows for the sake of the sweets: beginners are very often led into this second mistake by seeing the female goat moths clinging to the bark, and depositing their eggs: if these young gentlemen would examine the mouth of the goat moth they would find no honey-sucking apparatus; and in her tubular ovipositor, thrust deep into the crevices of the bark, they would discover the real object of her visits to the willow-bark.—*Edward Newman.*]

Capture of a Sturgeon in Fresh Water.—It having been rumoured for some time past that a large fish was daily to be seen in the river at Hemingford-Grey, Huntingdonshire, a party of the lovers of aquatic sport set out in right good earnest to capture the talked-of monster, or for ever set at rest the story of the large fish in the pits of Hemingford Mills. The expedition succeeded, and a large sturgeon (*Acipenser sturio*) was taken, after some trouble and manœuvring in landing, on the 21st of August, 1860. I annex its exact dimensions, &c.:—length, 7 feet; in girth, 3 feet; weight, 112 lbs. The fish was particularly rich in colouring, and presented a very fresh appearance.—*S. P. Saville; Jesus Terrace, Cambridge.*

The Mollusca of the Firth of Clyde. By the Rev. Alfred Merle Norman, M.A.

(Continued from p. 5887.)

(I much regret that so long a time has elapsed since the publication of the preceding portions of the paper. In removing from Leicestershire to my present residence some of the MSS. were mislaid, and have only recently been found.

Since the former parts were printed the results obtained by the Dredging Committee of Lamlash Bay, consisting of Dr. Greville, Rev. C. P. Miles and others, have been published in the 'Report of the British Association for the Advancement of Science for 1856.'

To this report it will be known that I refer when I attach the names "Greville and Miles" to any locality or note. The Committee again pursued their investigations in 1857, and during the autumn of that year I was myself at Lamlash for a few days' dredging, and had the pleasure of meeting Professor Balfour, the only member of the Committee then left upon the island.)

Class III. PTEROPODA.

Fam. II. *Limacinidæ.*

Spirialis Flemingii (*Fusus retroversus, Peracle Flemingii, Crania Flemingii?* misprint). Mentioned by Dr. Landsborough as found at Lamlash.

Class IV. GASTEROPODA.

Div. 1. Prosobranchiata.

Fam. I. *Chitonidæ.*

Chiton fascicularis. Under stones at extreme low-water mark in Balloch Bay, Cumbrae, and at the outer Allans, also at Lamlash.

C. ruber. Uncommon; occasionally dredged attached to stones near Tan Buoy, Cumbrae, and between Clachland Point and Holy Island. Ayr, *Smith.*

C. cinereus (*Chiton marginatus, Chiton fuscus*). Abundant under stones between tide-marks, but not richly coloured; large specimens may be taken at the northern extremity of Fintry Bay, Cumbrae.

C. Asellus (*Chiton cinereus?*). Abundant in deep water attached to shells and stones. Full-grown specimens from the Clyde are always clothed with a black incrustation.

B. lævis. Rare, and always small, not much exceeding half an inch. I have taken it at low water, and with the dredge down to twenty fathoms.

C. marmoreus (*Chiton lævigatus*). Bute, *Smith.* Occasionally off the Tan Buoy, Cumbrae, and also within and outside Lamlash Bay. Mr. Alder's cabinet contains a fine series from Rothesay Bay.

Fam. II. *Patellidæ.*

Patella athletica. Mentioned by Dr. Landsborough. I have not met with it.

*P. vulgata. Common, of course, but not so abundant as usual. A pretty variety is found at Scolag, in Bute, low-spired and strongly ribbed. This is a form that I have never observed elsewhere. It will

be found to be a general rule with regard to the limpet, that the nearer high-water mark the shell is taken, the higher spired, more strongly ribbed and smaller it will be; and that the lower down it lives, the flatter, less ribbed and larger it becomes. The above-mentioned form, which has the flat skin of the low-water variety, with the strong ribs of the high-water form, was found just beyond low-water mark.

*P. pellucida (*Patella cærulea*). Not uncommon on Laminariæ, but the specimens are always small.

Acmæa testudinalis (*Lottia testudinalis, Patella testudinalis, Patella Clealandi*). Few British shells can compete with this limpet in beauty. In the Clyde it is very abundant, though somewhat locally so. The kind of locality in which it should be looked for is among beds of large stones, when laid bare at the lowest spring tides; it rarely occurs except on detached pieces of rock. On the Bute shore, from Scolag round to Rothesay, it may be taken in great abundance. Varieties occasionally are of an uniform dark brown, while others are nearly pure white. Acmæa testudinalis is a peculiarly interesting mollusk, on account of its steady migration southwards. This fact is noticed by Forbes and Hanley, who trace its wanderings down the western coast from Scotland to Bangor, in Ireland, and, at a subsequent period, as far south as Dublin and the Isle of Man. At that time it was not known in the east of Scotland nor anywhere on the shores of England. A little later, however, it was met with in great abundance on the shores of the Moray Firth; in 1856 it was noticed in the Faroe Islands, Northumberland, by Mr. Tate, and at Whitburn, in Durham, by the Rev. G. C. Abbes; and in 1857 Mr. Albany Hancock fell in with it at Roker, yet further south on the coast of Durham. We have a strong proof that the species has only recently arrived at the last-named localities, in the fact that it has occurred in spots which have been thoroughly explored by Dr. Johnston, Mr. Alder, Mr. Hancock and other well-known naturalists, whose keen eyes could not have overlooked so conspicuous a shell. We shall probably hear before long that it has put in an appearance at Whitby or at Scarborough.

*A. virginea (*Lottia virginea, Patella virginea*). On stones and at roots of Laminariæ from low-water mark to twelve fathoms; common.

Pilidium fulvum (*Patella Forbesii, Patella fulva, Pilidium rubrum*). "This mollusk was first announced as a member of the British Fauna by Mr. Smith, of Jordan Hill, who dredged it in the Clyde, off Arran." —*F. & H.* In one confined spot just outside Lamlash Bay, a little to

the south-east of Clachland Point, this beautiful little shell may be met with in some abundance. If the right ground be hit upon, the dredge will come up filled with stones, mixed with perfectly black and thoroughly rotten shells of Pecten opercularis. If the dredger succeeds in finding this ground, he will be upon the most productive spot in the whole district of the Firth of Clyde. The careful examination of the stones and Pecten shells from this locality has given me, among many others, the following shells, several of which do not occur elsewhere in the district:—Astarte sulcata, Pecten tigrinus, P. striatus and P. similis, Terebratula Caput-Serpentis, Crania anomala, Pilidium fulvum, Puncturella noachina, Bulla Cranchii, Mangelia septangularis and P. teres, Trichotropis borealis, &c. Varieties of the Pilidium sometimes occur, having a pale ground marked with brilliant orange rays, while others, which are very rare, are wholly yellowish white.

Propilidium alcyloide (*Patella alcyloides*) is another of the shells originally described as British from the Clyde. It "was added," write Forbes and Hanley, "to the British Fauna by Mr. Smith, of Jordan Hill, and one of the authors of this work, when dredging in Lamlash Bay, in 1839." "Two specimens, dredged alive off Ballantrae, Ayrshire, in 1842, were sent me by Mr. Edward Getty. Dead shells are not uncommon among comminuted nullipores dredged in Lamlash Bay, Arran, in 1846, by Major Martin and the Rev. David Landsborough," *W. Thompson*. Notwithstanding this assertion that it is "not uncommon" I have never had the good fortune to meet with the species, although I have examined bushels of "comminuted nullipores" from the little Bay, now known to the boatmen as "Landsborough's Bay," on account of Dr. Landsborough having so frequently dredged there for this comminuted nullipore, which abounds in minute shells, many of them very rare species. Unfortunately the specimens are for the most part very much worn, and of little value for the cabinet.

Fam. III. *Dentaliadæ.*

Dentalium entalis. May be found in most suitable situations,—namely where the water is deep and the bottom mud. Abundant outside Kames Bay, Cumbrae.

Fam. IV. *Calyptræadæ.*

Pileopsis hungaricus (*Capulus hungaricus*). Not common, and always small. Its range is from low water to twenty fathoms.

Fam. V. *Fissurellidæ.*

*Fissurella reticulata (*Fissurella Græca*). Bute, *Smith.* Between Holy Island and Clachland Point, *Greville and Miles.*

Puncturella noachina (*Cemoria Flemingii, Fissurella noachina*). Abundant in company with Pilidium fulvum, to the note on which species I beg to refer. It has likewise occurred to me off the west of Cumbrae. Bute, *Smith.* Mr. Smith was the first to record this species as living on our coasts.

Emarginula reticulata (*Emarginula fissura*). Common on shells and stones in the coralline zone.

E. crassa. Has been taken by Mr. Barlee in Loch Long, *Forbes and Hanley.*

Fam. VI. *Trochidæ.*

Trochus zizyphinus. Not very common.

T. alabastrum. "Lamlash Bay, dredged by Mr. Eyton," *Greville and Miles.* Surely there must be some error?

T. millegranus (*Trochus Martini*). Frequent among nullipore in the Laminarian and Coralline zones. Specimens in good condition are comparatively scarce, as its sculptured surface renders it peculiarly liable to be incrusted with Balani, Serpulæ, &c.

T. exiguus (*Trochus interruptus*). Ayr, *Smith.* Perhaps from ballast, or T. Montagui may have been mistaken for it, as that species is not mentioned in Mr. Smith's list.

T. Montagui (*Trochus Montacuti*). One specimen taken off Cumbrae is all that has occurred to me. Dr. Landsborough records it as found at Lamlash.

T. tumidus. Common.

*T. cinerarius (*Trochus perforatus*). Abundant.

T. umbilicatus. Common.

T. magus. Not common. The Clyde specimens, though frequently very large, are always very dull in colouring, indeed generally destitute of all painting.

*T. crassus. Cumbrae, *Smith.* There must surely have been some mistake in the admission of this species; probably the specimen found was from ballast.

T. undulatus. Recorded as found at Lamlash by Dr. Landsborough.

T. helicinus (*Margarita communis, Margarita vulgaris*). Frequent

at low water; the Allans, Cumbrae and Lamlash Bay; also taken with the dredge on fronds of Laminariæ.

T. pusillus. Common in Lamlash Bay, more particularly in that part known as "Landsborough's Bay."

Adeorbis subcarinatus (*Trochus subcarinatus*). Among shell-sand from Lamlash Bay.

Fam. VII. *Ianthinidæ.*

Ianthina communis. Is mentioned by Mr. Smith as having been taken at Loch Ryan. Loch Ryan is a little to the south of the district which this paper includes, but as the Ianthina is an oceanic shell there is no reason why a "west-sou'-wester" may not waft it from the Atlantic to the Ayrshire coast.

Fam. VIII. *Littorinidæ.*

*Littorina neritoides (*Littorina petræa, Turbo neritoides*). Local, but not uncommon, and may be met with in some abundance on the rocks of the outer Allans, Cumbrae.

*L. rudis (*Littorina vulgaris, Turbo rudis* and *T. rugosus*). Common.

L. patula. Local. On the rocks at Callums Hole, Bute, and at the Corriegills, Arran.

L. tenebrosa. In little pools in the salt marsh at Brodick.

L. saxatilis (*Littorina neglecta*). Plentiful in company with L. neritoides at Allans, Cumbrae; also in rock pools at Clachland Point, Arran.

*L. littorea (*Turbo littoreus*). Common.

*L. littoralis. Common.

Lacuna pallidula (*Natica pallidula*). Rock pools, Cumbrae, not common; Lamlash, Ayr, *Smith.*

L. puteolus. Frequent in a large rock pool at the outer Allans, Cumbrae. The strata of the Allans dip towards the sea. The sea has worn away the softer material between two upturned outcropping layers that raise themselves out of the sea, presenting their smooth, sloping, and steep-inclined surfaces to the sea, and their broken and rugged summits to the land. The channel thus worn away between the two strata forms a large rock pool, the bottom of which is never disturbed even in the heaviest seas. The water finds its way in and out of this rock pool by narrow channels passing between the loose piled-up stones which close the entrance at either

end. At the lowest spring-tides, perhaps two or three times a year, this rock pool is left entirely dry, but at ordinary spring-tides water remains in it to the depth of two or three feet. At such times the conchologist may reap a perfect harvest. He should go provided with a bucket and a man or boy; the boy should be sent into the water to gather the weeds, while the conchologist himself washes them in the bucket; the sediment should then be taken home, dried, sifted, and examined at leisure; the stones of the rock pool and the stones within it should also be carefully examined. Among the shells taken in this rock pool, I may mention the present species and the two other members of this genus, Cerethium reticulatum and C. adversum, Rissoa rufilabrum, R. punctura and R. inconspicua, Jeffreysia opalina and J. diaphana, Acmæa testudinalis and A. virginea, Eulenia distorta, Trochus helicinus, Odostomia eulimoides, O. turrita and O. spiralis, Chemnitzia indistincta, Amphisphyra hyalina, &c.

*L. vincta (*Lacuna canalis* and *L. quadrifasciata*, *Turbo vinctus* and *T. quadrifasciatus*). In rock pools and on Laminariæ, not uncommon, but generally small.

Rissoa striatula (*Rissoa decussata*, *Pyramis striatulus*, *Cingula striatula*). Cumbrae, *Smith*. Rare among Lamlash Bay shell-sand.

R. crenulata (*Rissoa Cimex*, *Cingula Cimex*). Ayr, *Smith*; Lamlash, *Landsborough*. I have never met with it in the Clyde, but have received it from the Turbot bank, off the Antrim coast, so that it may be expected in the Clyde.

R. zetlandica. Lamlash, *Landsborough*.

R. Calathus (*Cingula calathisca*). Cingula calathisca is included in Mr. Smith's Catalogue as found at Cumbrae; Lamlash, *Landsborough*.

R. Beanii. Not uncommon among shell-sand from "Landsborough's Bay," but in a worn state. In a living state it is very rare.

R. abyssicola? Dr. Landsborough mentions with doubt a specimen of this beautiful Rissoa as having been taken at Cumbrae (*Lands. Excur.* p. 443). It is met with in Loch Tyne.

R. punctura (*Cingula punctura*, *Rissoa reticulata*). Abundant dead in Lamlash Bay, and alive in the large rock pool at the Allans, Cumbrae; Ayr, *Smith*.

R. costata (*Cingula costata*). Not common. A few dead specimens dredged at Lamlash; Ayr, Bute, *Smith*.

R. striata (*Rissoa minutissima*, *Turbo striatus*). Abundant.

R. parva (*Rissoa alba*, *Cingula parva*). Abundant. *Var.* R. interrupta, abundant. Peculiarly characteristic specimens are to be found in rock pools at Farland Point, Cumbrae.

R. costulata. Lamlash, *Landsborough.*

R. rufilabrum. Abundant on Zostera marina growing in the large rock pool on the Allans, Cumbrae; and also found, though less commonly, in similar situations at Lamlash, and probably throughout the district.

R. labiosa (*Turbo labiosus*, *Cingula labiata*). A few examples dredged in Kames Bay, Cumbrae. A large fragile form, abundant on the large Zostera beds near the Pier at Lamlash; Bute, Ayr; *Smith.*

R. inconspicua. Frequent dead and worn in Lamlash Bay. Occasionally found also alive on decaying Laminariæ and in rock pools.

R. tenuis (*Alder*). Mr. Alder is still firm in the conviction that the Rissoa inconspicua, *var.* c. of Forbes and Hanley, is a distinct species. The shell was first taken by him "at and a little below low water-mark at Rothesay," and he has since received it from Shetland.

R. Goodallii (*Alder*, *MS.*). I found a small Rissoa in company with R. rufilabrum at the outer Allans, which is referred by Messrs. Hanley and Jeffreys to R. inconspicua, of which species they consider it a dwarf form. Mr. Alder thinks it may be distinct, but adds "I should like to see the animal before making up my mind. The shell does not show any of the delicate markings usually found on R. inconspicua. The manuscript name of Goodallii in my cabinet was attached to them because I got the first specimens from Bean, who had received them from Dr. Goodall under the name of Turbo vittatus (a synonym of T. cingellus), and knowing they did not belong to that species, I attached the Doctor's name to them for distinction's sake."—*Alder in litt.* To this observation of Mr. Alder, I may add that I have myself seen this shell in cabinets erroneously labelled "Rissoa vittata."

R. semistriata. Lamlash, *Landsborough.*

R. cingellus (*Rissoa vittata*, *Turbo cingellus*). Not uncommon under stones near low water at many places in the district.

R. vitrea (*Turbo vitreus*). Lamlash, *Landsborough;* Ayr, *Smith.*

R. fulgida. I have procured a specimen or two in Kames Bay, Cumbrae, and also found the species at Lamlash.

R. rubra. Included in Dr. Landsborough's latest revised Catalogue of the Lamlash Bay Mollusca.

R. soluta. Mr. Webster has met with this species among some shell-sand I sent him from Lamlash Bay, and Dr. Landsborough and Mr. Bean had previously recorded it from the same locality. Bute, *Bean.*

*R. Ulvæ (*Cingula subumbilicata*). Common in the salt-water marsh at Brodick. Examples taken there are commonly of a very curious form. The whorls of the young shell are remarkably small; they then suddenly enlarge, and ultimately the small whorls of the upper portion of the spire drop off, leaving an obtusely truncated apex, as in the genus Truncatella.

Jeffreysia opalina. Confined, as far as my observations go, to the Allans rock pool, where it is abundant, but always small.

J. diaphana. In company with the last, and equally common in that locality, but has not been met with elsewhere in the district.

Skenea Planorbis (*Skenea depressa*). Very abundant.

S. nitidissima. Frequent. Alive in rock pools at Clachland Point, Arran; and dead in dredged Lamlash Bay sand.

S. Rota. Rare in sand from "Landsborough's Bay."

S. divisa. Frequent in the same locality as the last.

S. costulata. There is a specimen of this shell, which I have seen, in the cabinet of Mr. Bean, who procured it from Lamlash Bay sand. The genus Skenea in the 'British Mollusca' contains a motley assemblage of minute shells which had since proved to belong to widely different genera, and, which, indeed, were only provisionally placed by Forbes and Hanley together. Jeffreys and Messrs. Adams (in their 'Genera of Recent Mollusca') would retain Planorbis as the sole representative of the genus Skenea; Messrs. Adams deposit the remaining species in the genus Cyclostrema, *Marryatt*, among the Trochidæ, while Jeffreys places Culteriana, costulata (?), lævis (?) and divisa in Margarita, among the Trochidæ, and has constituted a genus Omalogyra for the reception of nitidissima and Rota: he leaves this genus among the Littorinidæ. Clark unites Planorbis to the genus Rissoa, places Culteriana, divisa, costulata and lævis in Trochus, nitidissima in Truncatella, and "believes" that Rota is the young of Cæcum Trachea. The utmost that can as yet be considered satisfactorily determined is that Planorbis should remain in the family as it is, and that Culteriana and divisa must be removed to the Trochidæ; all the rest is conjecture, or at least has no sufficient proof.

Fam. IX. *Turritellidæ.*

*Turritella communis (*Turritella Terebra*). Not common.

Cæcum glabrum (*Brochus glaber, B. arcuatus*). Alive in rock

pools, Allans, Cumbrae; and Clachland Point, Arran. Common among the shell-sand of Lamlash Bay. Bute, *Smith.*

C. Trachea (*Brochus striatus, Dentalium Trachea, D. imperforatus*). Frequent in dredged shell-sand.

Fam. X. *Cerethiadæ.*

Aporrhais Pes-Pelecani (*Rostellaria Pes-Pelecani*). Frequent.

*Cerethium adversum (*Terebra perversa, Murex adversus*). Alive in rock pools, rare. Dead in Lamlash Bay shell-sand, frequent.

*C. reticulatum (*Buccinum reticulatum, Murex reticulatus*). Extremely common. The most abundant shell in the district.

Fam. XI. *Scalariadæ.*

Scalaria communis (*Scalaria elathrus*). I have procured through fishermen two or three specimens which were dredged in Lamlash Bay, where Dr. Landsborough has also taken it. Mr. Hennedy has met with the species at Gourock.—('*The Naturalist*,' 1852, vol. ii. p. 88).

S. Turtonis. Once dredged alive between the Corriegills and Clachland Point, Arran. Ayr, Bute, *Smith.*

Fam. XII. *Pyramidellidæ.*

Adis nitidissima (*Turritella nitidissima*). One example dredged close to the Clerk Rock, Isle of Cumbrae. Lamlash, *Landsborough.*

A. unica (*Turritella unica*). Lamlash, *Landsborough.*

Eulima polita. Occasionally taken throughout the district, but rare.

E. nitida, *Philippi.* Lamlash Bay, rare.

E. bilineata (*Eulima subulata*). Lamlash, *Landsborough.*

E. distorta. Not uncommon in rock pools and by washing seaweeds dredged in the Laminarian zone; also dead in Lamlash Bay shell-sand. A strongly marked, much elongated, straight and larger variety of this shell from the "Clyde district" is distinguished by Forbes and Hanley under the name of gracilis. I have procured it abundantly from off Tarbert in Loch Fyne, but have not met with it in the Firth of Clyde.

Chemnitzia rufescens. This is probably specifically identical with C. scalaris, scalaris being the southern and rufescens the more usual northern form of the same shell. Chemnitzia rufescens "is a rare animal, occurring occasionally and sparingly in the Lochs of the Firth of Clyde."—*Forbes and Hanley.* I have taken it in Lamlash Bay.

C. indistincta. Not uncommon alive in rock pools; also taken with

the dredge off Fintry Bay, Cumbrae; and in shell-sand from "Landsborough's Bay."

C. clathrata. The Parthenia clathrata of Jeffreys is included by Dr. Landsborough among the Lamlash shells. I do not know what shell Dr. Landsborough can refer to under that name. The specimen of C. clathrata in my friend Mr. Jeffreys' cabinet still remains, I believe, unique as British.

C. eximia. Mr. Bean discovered among Lamlash shell-sand a shell which he referred with doubt to Rissoa Balliæ of Jeffreys, which is synonymous with Chemnitzia eximia (*vide* Lands. Excur. Arran. p. 363). Subsequent observation has not confirmed this surmise.

Odostomia conoidea. Lamlash, *Landsborough.*

O. unidentata. Common in Lamlash Bay shell-sand, and I have likewise taken it alive.

O. plicata (*Turbo plicatus*). Bute, *Smith.*

O. turrita, *Jeffreys.* Alive in rock pools at the outer Allans, Cumbrae, and Clachland Point, Arran; and dead in shell-sand in Lamlash Bay. Perhaps this is the shell which Mr. Smith took at Bute, and recorded as Turbo plicatus. I have not yet met with that species in the district.

O. eulimoides. Frequent on the wings of Pecten opercularis, dredged on the bank near the Tan Buoy, Cumbrae. The Pectens are covered with an encrusting red sponge, which Dr. Bowerbank will describe in his Monograph about to be published by the Ray Society under the name of Halichondria favinaria. The Odostomiæ appear to feed upon this sponge.

O. eulimoides, *var. b, Jeffreys* (*Turbo pallidus*, Mont.). This well-marked form is frequently found among Lamlash sand.

O. rissoides. Occasionally alive in rock pools, and dead in shell-sand, but generally small.

O. albella (*Lover*). Alive among coralline in rock pools at Clachland Point. This would certainly seem more distinct from O. rissoides than many other described species.

O. cylindrica. Occasional. One large specimen from Lamlash shell-sand I was inclined to think might be distinct, but Mr. Jeffreys refers it here.

O. interstincta. Not uncommonly taken in rock pools, and with the dredge. The Odostomia costata of Bean, which he took in Lamlash Bay, is merely an elongated form of this species.

O. spiralis. Alive in rock pools at Cumbrae. Dredged off Fintry Bay, and near the Clerk Rock, Cumbrae. Dead in Lamlash shell-

sand. Odostomia ornata is a MS. name given by Mr. Bean to a variety of O. spiralis, in which the spiral line at the base is obsolete. It is taken among Lamlash Bay shell-sand.

O. decussata. Frequent among the comminuted nullipore of "Landsborough's Bay," which I have so frequently spoken of in this paper as "shell-sand." A very large portion of the "sand" consists of minute shells and the broken fragments of their larger brethren. Odostomia decussata is now and then found alive, but is far more frequent in a dead and worn state.

O. excavata (*Rissoa Harveyi*, Thompson, *Parthenia turrita*). Dead specimens rare among Lamlash Bay shell-sand. I have never met with it alive.

Eulimella Scillæ. Said by Forbes and Hanley to occur "throughout the Clyde district." I have procured it from off Tarbert on Loch Fyne, but have not met with it in the Firth of Clyde.

Truncatella Montagui (*Turbo subtruncatus*). Turbo subtruncatus is reported by Mr. Smith to have occurred at Ayr. It is hardly likely to be met with alive so far north. The specimens were probably from ballast.

Otina Otis. I found a specimen of this shell among washed weed from Clachland Point, Arran. This is, I believe, the most northern locality in which this species has been found. Professor Forbes met with it in the Isle of Man. Dr. Gray has removed the genus Otina, apparently on good grounds, from its position here, and has associated it with the Auriculadæ.

ALFRED MERLE NORMAN.

Sedgefield, Ferry Hill,
September 4, 1860.

(To be continued).

On the Habits of the Argonaut.—Any original observations on the habits of so interesting a mollusk as the argonaut should be welcome to the zoologist. Such I consider are those made by my friend, Mr. Thomas Kerr, of New Zealand. On the occasion of his making a voyage across the North Pacific, one hundred and fifty miles north of the great bay on the north side of New Guinea, he took a living argonaut in the towing-net. The rest he shall tell himself: "I put it," says he, "into a tumbler of water to observe its motions at leisure, but, to my surprise, it was instantly out of the shell and darting with great rapidity round and round the glass in the usual cuttle-like manner—stern first; it finally rested on the side of the tumbler, emitting a current of water from its swimming tube, and sinking to the bottom was soon dead. I several times placed it in the shell, but it never remained. While swimming it assumed a

rich deep brown colour, which, while at rest, only remained as eye-like spots all over the body. Sepia was expelled from an interior tube protruded between the mantle and the base of the swimming-tube. The shell, containing ova, appeared of the same specific gravity as water, for it rested wherever it was placed. The 'Zoe' I presume is the male organ; it moved about with a writhing motion, the lower disk being apparently surrounded by suckers; both it and the eggs possessed the eye-like spots and the power of changing them." My friend forwarded me the specimens in a bottle of alcohol, but unfortunately they never reached me. We were very far apart, and the "Ocean Parcels Delivery Company" I believe is not yet in existence. The account, however, confirms some observations I made during a former voyage concerning the facility with which the argonaut quits her shell, and the presence of the parasitic male is highly important as proving the sex of the shell-constructing individuals. My friend, Mr. Kerr, was, I believe, unacquainted with my observations.—*Arthur Adams; Olga Bay, Manchuria, August* 3, 1859.

On the Capture of Telmessus serratus in Manchuria.—I land as usual with the "seining party," for, besides the exciting pleasure of catching good fish, there is a chance of securing something interesting to the naturalist, but not fit for the "pot." We choose a shallow sandy bay full of "tangle," and where a little rivulet runs into the sea, for in such localities do the salmon love to congregate. It is evening, and the poor Chinese fishermen have hauled their canoes high up upon the beach. They have lighted their wood fires, and are peacefully employed, some smoking, and others preparing the supper of fish. Huge rocks crowned with trees, dark and solemn in the twilight, form the back ground, and already the fireflies have commenced their intermittent illumination. The seine is taken out in the "jolly boat," and forms a vast semicircle in the water, and the sailors are scattered through the bush cutting down trees and making huge fires to attract the fish. Soon parties in long boots and in bare legs assemble at either end of the seine, and singing songs, if not select, yet cheery, commence hauling in the net. Glittering scales and silvery bellies soon show themselves above the water, and as the seine is landed, amid great excitement, a tumbling, leaping mass of fish is thrown upon the sand. "Here's a kinger" cry the sailors as they "fist" a noble salmon. "Only a toader" cries another, casting high up among the bushes an ugly brown Tetraodon. "Here's an *adjective* big turbot" says a short man with a rubicund proboscis; and "Here's shrimp sauce for the turbot" says a long pale boy, with a squint in his eye, picking up prawns three inches long; and "Here," sings out another of the jovial crew, "is a curio for the Doctor." With that a hairy man of the sea brings me a large yellow somewhat apathetic crab with "Please, sir, is this any good; I never seen another like 'im," and I thank him courteously, and take possession of a splendid, perfect, living specimen of my friend Adam White's Telmessus serratus.—*Arthur Adams; Olga Bay, Manchuria, August* 3, 1859.

Capture of Gonepteryx Rhamni, var. *Cleopatra.*—I have to announce the capture of that remarkable variety of Gonepteryx Rhamni called Cleopatra: it was taken by my uncle, Mr. John Fullerton, in his grounds at Thrybergh Park, near Rotherham,

on the 27th of June, in this year. The fore wings are much more suffused with orange than those of the specimen which Mr. Curtis figured, and the specimen resembles exactly the Italian specimen of Cleopatra in Mr. Hope's collection.—*H. Adair Pickard; Christ Church, Oxford, August* 27, 1860.—*From the 'Intelligencer.'*

Description of the Larva of Acidalia inornata.—Full-fed larva rigid, rugose; body rich dark chocolate-brown, intersectional bands grayish, with a light spot in the centre; head slightly bifid, with two raised white spots at the back; dorsal and subdorsal lines light and distinct on the first four segments, interrupted to the ninth; dorsal lozenges on the middle segments indicated by a dark outline, half of the last lozenge and hinder segments light brown, with a broad dark line running down the centre; belly gray. This larva hybernates, and will feed on Polygonum aviculare, P. Hydropiper, a species of Galium, Cerastium arvense, &c.—*James Batty; 133, South Street, Park, Sheffield, August* 20, 1860.—*Id.*

Description of the Larva of Eupithecia satyrata.—

Var. 1. Ground-colour pale yellowish green, segmental divisions yellow. Central dorsal line dusky green. Down the centre of the back a series of Y-shaped dusky green blotches, edged with purplish brown, and becoming confluent or merged in the central line on the anterior and posterior segments. Subdorsal lines very slender and indistinct, dusky green. Spiracular line yellow. Between the subdorsal and spiracular lines a row of small slanting purplish blotches. Back studded with very minute yellowish tubercles.

Var. 2. Back greenish white. Central dorsal line pinkish or rose-colour. Subdorsal lines ditto. Down the centre of the back a series of large rose-coloured and rusty red goblet-shaped blotches, becoming faint or merged in the central line on the anterior and posterior segments. Spiracular line waved, rose-colour. Subdorsal and spiracular lines connected by a number of slanting rose-coloured streaks. Belly pale sea-green or greenish white, with a central white line. Back studded with numerous small white tubercles.

Var. 3. Whole of the back suffused with rose-colour. Subdorsal lines yellowish. Dorsal blotches edged with yellow. Spiracular line interrupted with yellow patches. Belly greenish white. Ventral segmental divisions white.

This larva tapers considerably towards the head; it is very local, but occurs in some plenty in some parts of Buckinghamshire, where, however, it is confined to the open spaces between and near the beech woods. It feeds upon the petals of almost any flower which happens to grow in the locality, *e. g.*, Centaurea nigra, Knautia arvensis, Gentiana Amarella and G. campestris, Apargia hispida, Origanum vulgare, Prunella vulgaris, Galium Mollugo, &c., preferring the two first-named. It is full-fed in September. The pupa, which is enclosed in an earthen cocoon, has the thorax and wing-cases golden yellow suffused with red. Abdominal divisions and tip red. The perfect insect appears in June.—*H. Harpur Crewe; Drayton-Beauchamp, September* 22, 1860.

Description of the Larva of Eupithecia helveticata.—Short and stumpy, the same thickness from tip to tail. Back and belly bright green. Central dorsal line dark green. Subdorsal lines pale yellow. Spiracular line yellow, waved. Anal tip of central dorsal line purplish. Head slightly bifid, dusky, curved inwards. Central ventral line pale yellow. Spaces between the subdorsal and spiracular lines darker green than back and belly. Feeds on the common juniper (*Juniperus communis*). Full-

fed throughout September. Resembles in many respects the larva of E. sobrinata. For the larvæ from which the foregoing description is taken I am indebted to the kindness of Mr. Andrew Wilson, of Edinburgh. The pupa, which is enclosed in an earthen cocoon, has the thorax and abdomen bright green, the latter sometimes yellowish. Wing-cases much darker, very transparent. Central dorsal line dark green. Abdominal divisions and frequently the border of wing-cases reddish. Tip of abdomen blood-red. Under side of ditto yellowish.—*Id.*

Description of the Larva of Eupithecia subumbrata.—

Var. 1. Very long and slender, tapering very much towards the head. Ground-colour dull yellowish green. Central dorsal line broad, dark green, narrower at the segmental divisions. Subdorsal lines dusky, very narrow and indistinct. Dorsal segmental divisions orange. Ventral ditto yellow. Spiracular line dusky green. On each side of the head and anal segment a yellowish line.

Var. 2. Ground-colour dirty greenish brown. Central dorsal line dusky olive. Subdorsal lines ditto, narrow. Posterior segments reddish. In other respects resembles var. 1.

This singular long thin larva I have been in the habit of taking at intervals for some years past in Buckinghamshire. It feeds upon the same plants and in the same localities as Eupithecia satyrata, preferring perhaps Apargia hispida and Crepis taraxifolia. It is full-fed at the end of August and throughout September. The pupa, enclosed in an earthen cocoon, has the thorax and wing-cases dark green. Abdomen ochreous, tip dusky red. The perfect insect appears in June.—*Id.*

Reappearance of Leucania putrescens at Torquay.—Last night I was fortunate enough to take a fine specimen of this insect, about a quarter of a mile from the place where I took them before. It is more than a month later than I took the species last year, in consequence, I suppose, of the bad weather. I found it on the flowers of Teucrium Scorodonia, which plant is very attractive to moths in general.—*R. M. Stewart;* 3, *Park Place, Torquay, Devon, August* 28, 1860. Since my last communication I have taken two more specimens of L. putrescens; they are both apparently fresh from the pupa.—*R. M. Stewart; September* 3, 1860.—*From the 'Intelligencer.'*

Discovery of the Food-plant of Nemotois scabiosellus.—The larva of Nemotois scabiosellus is found; we have bred it from the egg; its food-plant is Scabiosa arvensis. We repeated an attempt which we made three years ago, and which then failed; we collected the specimens we found *in copulâ* and some scabious heads, on some of which both males and females were sitting. We observed the females, both out of doors and in our breeding-cage, at work laying their eggs. The flowers and seeds are the first abodes of the larvæ; the eggs are laid in the fructification of the scabious flowers, each enclosed in a seed-capsule. When the interior of the seed has been eaten out by the larva it immediately uses the husk as a case, having gnawed a hole at the lower truncate end of the husk; at this age the larva seems to attack other seeds, boring into them and eating out the contents. Two of the larger larvæ have already made their large cases out of pieces of dried leaves, but how this process was performed has not yet been sufficiently observed. Probably the more advanced larvæ feed on the leaves of the scabious and other low plants. Some were observed in the act of gnawing a dry leaf of the upright fly-honeysuckle (*Lonicera Xylosteum*). The credit of these observations, and of the successful treatment of the insects, is due to my son Dr. Ottmar Hofmann.—*Communicated by Herr Hofmann, of Ratisbon, to Mr. Stainton, and inserted in the 'Intelligencer' of September* 8, 1860.

Capture of Hallomenus fuscus near Lee.—Accident the other evening led my friend Douglas to lay his finger on an example of Hallomenus fuscus, and for a few more nights (wet or dry) we visited the locality, on the outlook for more. Fortune did not condescend to reward me until two nights ago, when spying one sitting in a new place I examined it thoroughly, shouted for Douglas to come, and I think we took about one hundred between us, and nearly as many last night.—*John Scott;* 13, *Torrington Villas, Lee, S.E.; August* 31, 1860.—*From the* '*Intelligencer.*'

Capture of Mycetophagus multipunctatus near Lee.—Whilst in search of a little Ceutorhynchus the other evening I happened to lay hold of a boletus containing a number of Mycetophagus multipunctatus, as well as a lot of the larvæ,—active little fellows who, every one, chose a different path across the paper on which the boletus was laid during examination, so that their capture again was rendered somewhat difficult.—*Id.*

Habits of Bledius tricornis.—The oozes here now, after the tide has gone down, and particularly if it should be a warm day (a thing which, I am sorry to say, is of rare occurrence this season), are literally swarming with Coleopterous insects, among which the showy Bledius tricornis is the most abundant: one can easily see where there is a colony of this insect, as each of them throw up little mounds of wet sand about half an inch high, before the mouths of their burrows; directly the sun appears they come out in thousands, and run from burrow to burrow. They look very conspicuous, owing to the bright colour of their elytra: as soon as the sun becomes obscured or the ground disturbed they run off as fast as they can to their habitations; on the re-appearance of the sun they emerge very slowly and cautiously, and if frightened then, or, when but a short distance from their burrows, they invariably run backwards into them. Some of them are brown, with pale straw-coloured elytra; these are, in all probability, individuals just arrived at maturity. If I had felt inclined to I am quite certain I might have filled several bottles with them. How they contrive to live I cannot imagine, as they must, during the high tides we have had for the last few days, have been covered with the tide for at least six hours each day; they appear, however, to thrive rather than otherwise, as directly the tide goes out they may be seen busily engaged reconstructing their burrows, which they do with marvellous rapidity and neatness. They first of all make, with their anterior legs and mandibles, a small hole sufficiently deep to contain their abdomen; after that is accomplished they work backwards in some extraordinary manner, shovelling out the wet sand with their posterior legs to the mouth of the hole; this they continue to do till they get down to a considerable distance: the sand which they throw up forms a barrier in front of their burrows, and is, I suspect, a short time prior to the rise of the tide, made use of to cover their holes, and so prevent the water from reaching them; this, however, I have never yet seen them do, so I cannot write positively. The insect which ranks next in abundance is Bembidium laterale, which, when the sun shines, runs in thousands over all parts of the sands far below high-water mark. Under seaweed B. pallidipenne hides, but is far from common; also in the same locality Aleochara obscurella, Phytosus nigriventris and Cercyon litorale; the latter insect has some remarkable varieties.—*Gervase F. Mathew; Raleigh House, near Barnstaple, September* 20, 1860.

On the Musical Powers of the British Species of the Genus Acalles.—In the July number of the 'Annals and Magazine of Natural History' appeared a most delightful paper "On Certain Musical Curculionidæ," by T. V. Wollaston, Esq. The musical insect

there treated upon is a Teneriffe species of Acalles, and most accomplished *artistes* they appear to be. We are informed that "it was a constant source of amusement to make these creatures stridulate, or 'sing' as it was usually called, which they would invariably do for almost any length of time when alarmed." The "song" is produced, it appears, by "a minute and rapid vibration of the apical segment of the abdomen," the friction of which against the inner surface of the elytra is the means whereby the little curculionidous musician produces its melodies. Mr. Wollaston conjectures whether all the Acalles have this remarkable power, but, he adds, as far as regards the species found in the Atlantic Islands, he has little hesitation in believing that they have. On reading this very amusing and instructive paper I felt a strong desire to ascertain, if possible, whether our British species possessed any amount of musical talent, not that I for a moment expected them to bear a comparison with foreign professors, for I believe we must be content at once to yield the palm of musical proficiency to the foreign *artiste*; still I am so easily charmed with the simple melodies of my native land that I determined, if possible, to ascertain what degree of musical ability our own minute Acalles could lay claim to. During a few week's residence at Deal I had the good fortune to capture considerable numbers of two species of Acalles, A. Roboris and A. misellus. In the first instance I tried the powers of single specimens by placing them in pill-boxes, which I shook to alarm the insects, and then applied them to my ear, for some time without success; at length I distinctly heard the notes of A. Roboris, they were "soft, gentle and low," in fact, simple melodies. I next placed a dozen in a single box, which I shook and applied to my ear, when I was delighted by a complete curculionidous chorus, the effect I must confess being somewhat monotonous, in consequence of the performers all playing in the same key. The fact was however established of A. Roboris being musical, and certainly a much more accomplished musician than A. misellus, which requires much coaxing and pressing in order to obtain the slightest proof of its capabilities. On closely observing the Acalles when turned on their backs and teased into harmony I could, with the aid of a good pocket lens, distinctly observe the rapid vibrations of the apical segment of the abdomen. Mr. Wollaston refers to other Coleoptera, which possess in a greater or less degree the power of stridulation, particularizing some species of Longicorns. Of the British species of that family the Aromia moschata is certainly no despicable performer, but as far as my experience enables me to judge I consider the Cychrus rostratus to be the most accomplished English musician, although the various species of the genus Necrophorus must be allowed to be highly accomplished performers. I have not had an opportunity of testing the musical capabilities of the third British Acalles, the A. ptinoides.—*Frederick Smith, British Museum.*

Capture of Tropideres sepicola—I have great pleasure in recording the capture of another specimen of this rare Curculio, by stripping off the bark of a semi-decayed oak in Buddon Wood; this being the third British specimen discovered.—*F. Plant; Leicester, September* 10, 1860.

Capture of Trichodes hispidus in Leicestershire.—Late in July last, accompanied by Mr. F. Plant, of Leicester, I visited Buddon Wood, near Quorndon, Leicestershire, in search of Coleoptera, and on removing some semi-decayed bark from a young oak tree observed specimens of Trichodes hispidus underneath. We each succeeded in capturing several. We again visited the spot a month later, and then captured more specimens under similar circumstances on the same tree, and also underneath the decaying bark of several others near.—*John S. Harris; Burton-on-Trent, September* 11, 1860.

Sisyphus in Manchuria.—There is a nice little bay on the Manchurian coast which rejoices in the name of "Sio-wu-hu." You land on the sandy beach, to the left of a clear running stream, and you see before you a green level plain, bounded by distant hills. Cattle and horses graze here, for although the soil is sandy, yet the pasturage is good: the bird's-foot trefoil grows on it, in company with many grasses not to be distinguished from those of England,—the very dandelion seems the same; but on the outlying precincts, and among the young oaks which skirt the plain, that glorious wide-mouthed blue-bell (*Platycodon grandiflora*) blooms in all its pride, and Trollius asiaticus is as common as buttercups in a Hampshire meadow. Now the Manchurian bulls have stamped bare patches in this small savannah, and have also left other traces of their presence: in these deposits, associated with Aphodius, Geotrupes and Outhophagus, we discover our Sisyphus. You suppose we easily win this prize: on the contrary. What is that dark body moving steadily and slowly across the plain? It is a herd of cattle commanded by a patriarch bull, with a great black head, reddish eyes, short horns and a dewlap that nearly touches the ground. We are serenely engaged in disentombing Sisyphus, and we just look up and continue our occupation: the moving mass of cows and calves, led on by the patriarch, steadily advances; there are many stoppages and much pawing of the ground, and some low bellowings, but onward it comes. Prudence suggests a retreat; courage and a desire for more specimens of Sisyphus, urge our remaining; so putting on an indifferent air, we go on turning over the sandy deposits: this seems to have some effect upon the bovine party,— patriarch bull, his admiring cows and their offspring, the playful calves, make a dead halt and stand staring. Thus we continue while a shard remains unexamined, when we rise and resume our stick, and stroll, with a would-be-careless air, towards the beach: the patriarch bull with the great curly head and dewlap and all his wives and concubines follow us down to the water, where, a boat being handy, we leave them. Whether our smaller stercoraceous ebon friend, with the gray curved hind legs, of these Tartarean regions, be the Sisyphus Schæfferi of the illustrious Swede, or a new species not yet described, remains for the present a mystery.—*Arthur Adams; Sio-wu-hu, Manchuria, August* 16, 1859.

The "Gold Bug," a Reminiscence of Rio.—It is a cloudy day when we shoot across the glorious harbour of Rio, eager to explore the sides of the Sugar-loaf Mountain. We rejoice that the sun so beneficently veils his fierce rays in a misty atmosphere, for our toilsome climb will be more pleasant. We have not gone far before the enthusiasm of the party breaks out into exclamations of surprise and delight at the beauty of the scenery, and we pronounce both Fauna and Flora to be quite as attractive as Humboldt and Von Martius have painted them. How the great showy butterflies languidly flap their particoloured wings! The buff corolla of the Thunbergia rivals in its modest beauty the variegated gaudy passion-flowers that hang in rich clusters from the branches of the trees. In damp, sequestered shadowy nooks the ferns are splendid, and as for the wasps and ants I fear they would startle even Mr. Smith, of the British Museum, from his calm propriety, nor would his neighbour in the insect-room, friend Adam White, be less astonished at the beetles and the myriapods. Half afraid of snakes I penetrate a dense thicket, and crawl on hands and knees to the stems of some wild plantains, meeting on the road all sorts of "clammy, slabby, creeping and uncomfortable life." Under the decaying leaves I find Juli of almost fabulous dimensions; Polydesmi with sculptured segments, centipedes wriggling away with rapid moving legs and serpentine undulations, and that

strange connecting link between the spiders and scorpions, yclept Phrynum and very beautifully figured, if I rightly remember, by Mr. Curtis in Griffiths' 'Cuvier's Animal Kingdom;' it is a harmless arachnidan, inert and sluggish, and spins no web: it most resembles in its habits the "harvest-men" of English stubble-fields. Here, too, I come across some living specimens of that curious snail Streptaxis, crawling over the moist leaves, and am surprised to find it extrude a very respectable proboscis, which at once removes it from the herbivorous Helicidæ: it should form a family of itself, Streptaxidæ, to follow Oleacinidæ, and in turn be followed by Testacellidæ, in the same manner as we have Bulimiuæ, Helicinæ and Limacinæ. But whither am I wandering, and what has become of the "gold bug"? Some of our party had been reading Edgar Poe's mysterious and imaginative tale of the bug, and, what is more, actually believed in the existence of such an insect; and, as if to confirm them in this belief, and to prove the wondrous bug to be no myth or fabulous creature of the poet's brain, I captured in my sweeping-net a splendid glittering Cassida, the elytra and thorax as of burnished gold. With laudable pride and exultation I display my prize; but, questionable mendacity, I also proclaim it to be the veritable gold bug of the American. One of my companions, now wandering in the wildest parts of Borneo,—a creature of as wild an imagination as the writer of the "Tales,"— eagerly desires a closer inspection—nay, he would hold it in his hand. Excited, he no sooner deposits the envied object in his palm, and caught the glitter of its golden wings, than lo! away flies the "gold bug," leaving dismay and amazement depicted in the faces of the surrounding group. Vain were the regrets at the loss of the "bug of gold,"—not another specimen was seen that day.—*Arthur Adams.*

A Question for Physiologists.—Last June I picked up at Pitton, near Salisbury, a common cockchaffer (*Melolontha vulgaris*) alive, and crawling in the following condition. Right elytron removed, leaving abdomen uncovered, of which only the shell remained, the intestinal organs having been all scooped out, excepting a very small portion at the anal extremity. Thorax with two large cavities on the upper side. Head, legs and feet uninjured. The cause of the injuries inflicted on the luckless cockchaffer was probably a bird, but what struck me most was the apparent unconcern with which the insect was able to move about. I placed it in a pill-box, and at the end of twenty-four hours found it still alive, though in a torpid and dying state. *Query.*—In what part of the insect was its vitality inherent?—*A. R. Hogan; Rampisham Rectory, Dorchester, September* 3, 1860.

Proceedings of Societies.

Entomological Society.

September 3, 1860.—H. T. Stainton, Esq., V.P., in the chair.

The following donations were announced, and thanks ordered to be presented to the donors:—'Monographie des Elaterides,' par M. E. Caudèze, Tome troisième; presented by the Author. 'Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien,' Vol. ix.; by the Society. 'The Proceedings of the Zoological Society of London,' 1860, Parts I. and II.; by the Society. 'Stettiner

Entomologische Zeitung,' 1860, Nos. 4—9; by the Entomological Society of Stettin. 'Coléoptères des Iles Açores,' par Frederic Tarnier; by the Author. 'The Zoologist' for September; by the Editor. 'Proceedings of the Literary and Philosophical Society of Liverpool during the Forty-ninth Session, 1859—60;' by the Society. 'The Journal of the Society of Arts' for August; by the Society. 'The Entomologist's Weekly Intelligencer,' Nos. 201—204; by H. T. Stainton, Esq.

Election of a Subscriber.

John Ellerton, Esq., of 9, Westmoreland Place, Westbourne Grove, was elected a Subscriber to the Society.

Exhibitions.

Mr. Stevens exhibited two examples of Diachromus germanus, recently captured in the town of Deal; one having been found by Mr. Smith, jun., crawling on the pavement; the other by himself, on the wall of a house.

Mr. Waterhouse exhibited examples of the larva, pupa and imago of Trichodes hispidus, forwarded to him by Mr. Plant, of Leicester.

Mr. Waterhouse also exhibited two species of Dorcatoma, both bred from rotten wood brought from Richmond Park. The first was D. flavicornis, and was merely exhibited for comparison with the second, which Mr. W. believed to be the D. chrysomelina of Sturm. It differs in being more oblong than D. flavicornis. The three terminal joints of the antennæ are much more dilated in the male, and the penultimate and antepenultimate joints have the upper edge emarginate. In specimens which appear to be females the corresponding joints differ much less from those of D. flavicornis; still the upper edge is slightly emarginate, and the three club joints are more unequal in size, the first being relatively larger.

Mr. Janson remarked that Mr. Frederick Smith had captured, some twelve years back, on old oaks near Peckham, a species of Dorcatoma which agreed well with Sturm's figure and description of D. chrysomelina; he had himself likewise taken the insect in the same locality, and had labelled it in his collection without doubt as D. chrysomelina, *Sturm*.

Mr. Pelerin exhibited a beautiful variety of Staphylinus cæsareus, having the pubescence entirely fulvous. Also, Platystethus nitens and Mycetophagus 4-guttatus, taken at Hornsey, both these species being of very rare occurrence in Britain.

Mr. G. King exhibited some fine varieties of Crambus paludellus, Argynnis Euphrosyne, Arctia villica and Calligenia miniata. Also, a series of Acentropus niveus, from Horning Fen, Norfolk.

Mr. Lewis exhibited specimens of Hallomenus humeralis, which he had lately found in abundance on a fence at Charlton. This species was first recorded as British in the 'Entomologist's Annual' for 1859.

Mr. Stainton exhibited some larvæ of Nemotois scabiosellus which he had received from Herr Hofmann, of Ratisbon. They had been obtained by collecting the scabious-heads in which females had been observed ovipositing. The difficulty attendant on the finding of these larvæ was now apparent, as the young larva fed *in* the seeds, and then made use of the seed-husk as a case, till it had attained a sufficient size to require a flat leaf-made case. Whilst ensconced in the seed-husk the larva could scarcely be detected, the inhabited seed-husk resembling so precisely the other seeds of the plant.

Mr. Janson exhibited specimens of a new British Donacia, D. Comari (*Ahr.*),

Suffrian, taken by the late James Foxcroft in Perthshire, in May, 1854. He remarked that this species so nearly resembled the common D. sericea, *L.* (D. Proteus, *Steph.*), that it has probably been confounded with it in some of our collections; it may, however, be readily distinguished by its parallel elytra, and the totally different structure of its antennæ, which are much shorter and stouter, with the third joint only just perceptibly longer than the second, and but very little shorter than the fourth; whereas in D. sericea the antennæ have the third joint fully half as long again as the second, and nearly as much shorter than the fourth. He observed that the occurrence of this species in Britain was particularly interesting, as it had hitherto been found only in the Hartz mountains, where it was discovered about the year 1806, by Dahl, who, from mercenary motives, not only kept its true locality a secret, but circulated various absurd and false statements respecting it; thus, Ahrens, in his 'Monograph of Donacia' (Neue Schriften der Naturforschenden Gesellschaft zu Halle, 29, 1810), relates that Dahl had beaten it in some numbers from pine trees. Twenty years subsequently, however (in the summer of 1830), Ahrens found the beetle in considerable plenty in the Hartz, on the leaves of Comarum palustre; and at the end of July in the following year Dr. Suffrian met with it under similar circumstances in the same locality (*vide* Ent. Zeit. Stett. vii. 85, 1846). Mr. Janson further remarked, that although our British species of Donacia are readily separable by external characters, several North-American species are not only so closely allied *inter se*, but, moreover, bear so strong a resemblance to certain European species, that while, on the one hand, certain slight yet apparently constant peculiarities in habit induce the conviction that they are really specifically distinct, it is, on the other hand, utterly impossible to find good diagnostics whereby to characterise them. A few evenings since, being engaged with Mr. Baly in endeavouring to throw the North-American Donaciæ of that gentleman's extensive collection into species, we remarked that many of the specimens presented an exserted organ at the apex of the abdomen; these we at first supposed to be males, but the microscope soon convinced us that they were females, and that the organ thus protruded was the ovipositor within its sheaths. To clear up the doubts we at first had on this point we examined many specimens, and the result not only satisfied us that this organ is the ovipositor, but that the structure both of the superior and inferior valves, especially the first, varies so much in apparently closely-allied species as to afford reliable characters for their discrimination.

Mr. Rye exhibited a Bagöus, apparently distinct from the recorded British species, taken at Hammersmith. Also, on behalf of Mr. Solomon, the following rare Coleoptera: — Aleochara ruficornis, from Campsie Glen, Glasgow; Philonthus lepidus, from Southport; Omias sulcifrons, from York; and Phlëophagus Spadix, from Purfleet.

Mr. McLachlan exhibited some Lepidoptera recently captured in the Isle of Wight, including fine specimens of Triphæna subsequa and Depressaria bipunctosa, and a long series of a Gelechia allied to G. instabilella and G. ocellatella, but considered by him perfectly distinct from either.

Mr. McLachlan also brought for distribution among the members a series of bred specimens of Coleophora saturatella.

Mr. Janson read the following letter, lately received by him from Walter Elliot, Esq., of Hawick, N.B., dated August 30, 1860:—

"Dear Sir,—I have not been unmindful of the interesting conversation I had with you in the month of June last, on the subject of the Hylobius Abietis, but several

things have occurred to call me away from home, and I have not been able to make much investigation, until within the last few days, into the ravages of the insect.

"I find that although well known to the working foresters with whom I have conversed, the insect has attracted little attention from proprietors of woodlands and country gentlemen.

"The larch is known to be failing throughout Scotland, and I believe throughout Britain; and much speculation exists as to the cause or causes. The Scottish Arboricultural Society, instituted in 1854, offered a prize in 1857 for the best essay on the causes of decay in the larch ('On the Dry Rot and other diseases in Larch and Spruce'), and in the volume of their 'Transactions' for the current year I find a short paper by James McNeoll, forester, of Abercairney, Crieff, which makes no mention of the Hylobius as a primary agent of destruction, but dwells largely on the physiological conditions required for a healthy plantation, and observes, incidentally, that the plants in crowded plantations become sickly and etiolated, and thus 'the languid circulation of the tree in summer invites the attacks of a species of beetle, whose ravages destroy the foliage, thus impairing the wood-producing foliage or power of assimilation.'—P. 8.

"Brown, in the 'Forester,' second edition, 1849, does not notice the beetle at all, but in the most recent work I can find on the subject, intituled 'The Larch Disease,' by Charles McIntosh, Blackwood, 1860, it is mentioned, among 'the accidental misfortunes the larch is liable to,' as evidently a very minor cause of the mischief so extensively prevailing in larch plantations, but its operations are limited 'to attacks on newly-planted larch, or such as are sickly.'—P. 113.

"The main causes of decay, according to these authorities, are:—

"1. The employment of bad seed, the produce of sickly or unhealthy trees. The larch appears to have been indiscriminately and very extensively planted on all kinds of soil. Many of these, particularly rich low-lying soils and undrained wet lands, are uncongenial to the nature of the tree, and the plantations have failed more or less accordingly, exhibiting what is called 'dry rot or decay at the heart.' It seems to be a fact that unhealthy trees produce a larger crop of cones than sound ones, and hence much bad seed has been gathered and distributed.

"2. Plantations on the old redsand-stone formation invariably fail; and this rock is very prevalent in Scotland.

"3. Plantations of larch on ground previously occupied by other coniferous trees, or indeed any trees, also fail.

"There is no doubt that larch timber has been much infected by what the foresters call 'dry rot' or decay at the heart, and probably the use of low, or rich, or wet soils may have been the occasion of this. I am also prepared to admit that mischief may have resulted from the employment of morbid seed. But I believe the attacks of this beetle have had far more to do with the destruction of trees than has hitherto been suspected. My present forester, a native of Sutherlandshire, says he has been familiar with the attacks of the beetle in the north for the last ten years. It has certainly been unknown in the south, where I now am, until within two or three years, and now it is swarming in every wood. Six years ago, when on a visit from India to my father-in-law in Ayrshire, the Hylobius was pointed out to me by the old forester at Blairquhan as a recent scourge which had just made its appearance. It appears, therefore, to have travelled from the north gradually towards the south. Several persons here whose attention I have drawn to the subject, and who have consequently directed observation more carefully to the matter, have been struck with the extent of the damage inflicted

by the beetle on the woods around, which they had previously attributed to such-like vague causes as dry rot, fungus, ulcers, &c., and I am persuaded that more careful investigation will invest the ravages of the Hylobius with a degree of importance they have not hitherto received.

"By this post I send you a small box containing specimens of the beetle of both sexes. One pair at least were captured in conjunction. I also send pieces of a stem of a young larch, showing how completely they have gnawn the bark. I find trees of all ages are attacked by them. On large trees the twigs that have been gnawn wither, but the rest of the tree looks healthy. Branch after branch, however, is destroyed, and then the top withers and the trunk dies. The numbers of the beetles are so great that I can suggest no means for destroying them. They are evidently on the increase, and will soon leave not a larch alive. I have also found them attacking the spruce occasionally.

"Have you been able to make any more discoveries of the habits of the Hylobius from the German work you showed me? I should be glad of any hints you can give me to direct further examination of the subject. As far as I can observe, the breeding season is now begun, but I have failed to discover any eggs or larvæ"—*E. S.*

Notices of New Books.

'*Journal of the Proceedings of the Linnean Society.*' Supplemental to vol. iv. Zoology. July 18, 1860. 8vo; 112 pp. letterpress; 1 outline Plate. Price 2*s.*

This part of the 'Journal of the Proceedings of the Linnean Society' contains three papers:—1. "Descriptions of New Species of Hymenopterous Insects collected by Mr. A. R. Wallace at Celebes;" 2. "Descriptions of Hymenopterous Insects collected by Mr. A. R. Wallace in the Islands of Batchian, Kaisaa, Amboyna and Gilolo, and at Dory in New Guinea." Both these papers are by Mr. F. Smith of the British Museum. 3. "Catalogue of the Dipterous Insects collected in Amboyna by Mr. A. R. Wallace, with Descriptions of New Species;" by Mr. F. Walker, F.L.S.

I am extremely pleased to see the Linnean Society adopting plain Roman type almost exclusively in the 'Proceedings' before me. There is something extremely confusing and therefore objectionable to my mind in the alternation of Roman and Italic sentences and words, as in the 'Insecta Britannica' and other modern works on Entomology.

'*A Catalogue of the Lepidopterous Insects in the Museum of Natural History at the East India House.*' By THOMAS HORSFIELD, M. & Ph. D., F.R.S., Keeper of the Museum; and FREDERIC MOORE, Assistant. Vol. II. London: Allen & Co., Leadenhall Street. 1859. 8vo; 160 pp. letter-press; 15 plates. Price 10*s.* plain, 20*s.* coloured.

It is impossible for any one who has taken the interest I have always done in the arrangement of Lepidoptera not to hail with gratitude the appearance of a work which professes to reflect the opinion of one who possessed almost unbounded materials, and who, for many years, made this subject his especial study. The late lamented Dr. Horsfield's account of the advantages he possessed is given in the following words:—

"I lived at this time at Surakarta, a province in the interior [of Java] belonging to the native princes. I was amply provided with every convenience and facility for preserving what I had collected. Several draughtsmen had likewise been trained under my superintendance, for botanical delineations; and the skill they acquired in those soon fitted them for the annulose department. I was therefore enabled to enter upon a history of the metamorphoses of Javanese Lepidoptera, a design which has long engaged my anxious solicitude. Although I did not at this period so fully conceive the paramount necessity of an acquaintance with the metamorphoses of Lepidoptera, towards the establishment of a natural arrangement, as I have been led to do in later periods, yet I was so strongly impressed with its essential importance in attempting a complete history of insects, that I commenced with a fixed determination to prosecute the inquiry with unremitted industry and zeal, to collect all the larvæ of Lepidopterous insects which I might possibly obtain, and to trace them through the various periods of their existence. With this view I fitted up a large apartment adjoining my residence with breeding-cages and receptacles for chrysalides. At the commencement of the rainy season, the period when, in tropical climates, the foliage of vegetables is renewed, I daily went out in search of caterpillars, accompanied by the most intelligent of my native assistants. The caterpillars thus collected were placed in separate breeding-cages, and several of the assistants were instructed to provide daily, at regular periods, the food the individuals required, and to secure the cleanliness of their cages. As soon as the caterpillars were approaching to

perfection a drawing was made of them. The same individual which had been submitted to the draughtsman was then separately confined, watched with the most diligent care, and, as soon as it had passed into the state of a chrysalis, again made the object of the pencil. A determinate number was carefully attached to the drawing and to the cage of the chrysalis. As soon as the perfect insect had appeared and expanded its wings it was secured, set, and numbered in accordance with the larva and chrysalis. During this period every possible solicitude was employed to prevent mistakes. The original series, consisting of the perfect insects and the chrysalides obtained by this mode of proceeding, and numbered in accordance with the collection of drawings made at the same time, is now deposited in the Museum of the Honourable East India Company, and affords an authentic document of the accuracy of the details regarding the metamorphoses of Javanese Lepidoptera, which will be offered in the course of this work."

Dr. Horsfield does not claim the merit of being the first to consider the larva as important in the natural classification of Lepidoptera, but he is the earliest English author who calls our attention to the invaluable work of Denis and Schiffermuller, whose maxim and motto of "One eye to the butterfly and another to the caterpillar" he cites with the cordial approbation it deserves.

It does not, however, seem to me that either the authors of the now celebrated Vienna Catalogue, or Dr. Horsfield himself, carried out the obviously important principle which both profess to admire. Denis and Schiffermuller commence by adopting the Linnean primary groups as final; and Dr. Horsfield by restricting his divisions to five, in accordance with MacLeay's singularly clever but most artificial hypothesis, thus grouping the whole of the Lepidoptera into Papilionidæ, Sphingidæ, Bombycidæ, Noctuidæ and Phalænidæ, and entirely ignoring as divisions such groups as Geometra, Pyralis, Pterophorus, Tortrix, Tinea and Psyche. Neither is the group Papilionidæ associated by any common character of the larvæ. Then the work before us makes no attempt whatever to pursue the hypothetical arrangement here superficially indicated. The accomplished author of the idea is now no more, and to other hands has been allotted the important task of working out the details, which, I say it without any feeling of disrespect towards the founder, are now unfettered by any attempt to force nature into that harness which none of us can compel her to wear.

The first volume, already noticed, treats of the Papilionidæ and Sphingidæ: the second, now before us, of the third tribe under the

name Bombyces, which are divided by characters of the larva into eight Stirps, as follows :—

Stirps	1.	Larvæ	sphingiformes.
„	2.	„	fasciculatæ.
„	3.	„	ursinæ.
„	4.	„	cuspidatæ.
„	5.	„	verticillatæ.
„	6.	„	limaciformes.
„	7.	„	pilosi.
„	8.	„	lignivoræ.

The first of these Stirps includes :—1st. Those xylophagous larvæ with heliophilous imagos, which form the tribe Sesiæ of Laspeyres, the genus Sesia of Guenée and Doubleday. 2nd. The Zygænidæ. 3rd. The Lithosiidæ and several Indian forms, which have only lately received names in Mr. Walker's 'Catalogue of the Lepidopterous Insects in the British Museum.' It therefore appears that in this first Stirps, although professedly associated on the larval principle, cryptophagous and phanerophagous genera are mixed up together, and the larval principle is thus abandoned as soon as proposed. In any natural arrangement the Sesiæ, being emphatically internal feeders, must be classed with the eighth Stirps, Lignivoræ, comprising Hepialus, Zeuzera and Cossus. The learned author is fully aware of the heterogeneous nature of this first Stirps, and alludes to it somewhat apologetically. As it is impossible to separate Sesia from the other Lignivoræ, so is it unnatural to divorce Eusemia from Callimorpha and Chelonia; and Zygæna, Eusemia, Lithosia, Callimorpha and Chelonia must therefore either constitute two proximate groups running parallel with each other, or be fused together into a somewhat unmanageable whole.

In the second Stirps, Fasciculatæ, the beautifully distinguishing character of the hairy pupa is not rigidly adhered to; and this has led to the introduction of genera which, it appears to me, ought to be excluded. The other Stirps are much in accordance with those now generally adopted.

This question, however, remains. Seeing that the unnatural combination called Sphinx by Linneus is thus broken up, why should the true Sphinges, reduced in the East to the small number of forty-nine species, constitute a separate primary division of Lepidoptera? Their larvæ are beautifully distinct and characteristic, but then so also are those of the Fasciculatæ, Lignivoræ, Ursinæ, Cuspidatæ, &c.; and in

no respect are the true Sphinges more distinct, more numerous or more important than either of these.

The numbers of eastern species of the three primary groups or tribes stand thus :—

Tribe I.	Papiliones . . .	595
Tribe II.	Sphinges . . .	49
Tribe III.	Bombyces . . .	346

There is every reason to believe that these numbers nearly represent the proportions of the three groups, and it is therefore clear that the Sphinges are not by their numbers entitled to rank as a primary group. Then their larvæ are not more different from those of the seven characterised divisions of Bombyces than those are from each other; there is, in fact, no reason, logical or entomological, why they should rank differently from the other divisions. I therefore take the ascertained Bombyces of the East as 395. That the recorded Bombyces should be less in number than the Papiliones is not altogether remarkable when we recollect the attractive appearance and diurnal flight of the latter. It will be admitted on all hands that the Bombyces, with or without the addition of the Sphinges, is a most unsatisfactory group on account of its heterogeneous contents; not one of those characters by which we are accustomed to disintegrate the Lepidoptera can possibly be applied to it.

Turning our attention to the Lepidoptera at present untouched by the authors whose labours I am noticing, we find two groups numerically enormous, yet singularly homogeneous in their contents, and singularly distinct from each other; these are the Geometræ and the Noctuæ. They differ essentially both in the larva and imago states; the larvæ of Geometræ have but four claspers, those of the Noctuæ ten; the hind wings of Geometræ have the same pattern or disposition of colours as the fore wings, the hind wings of the Noctuæ have a different pattern from the fore wings; there is no similarity between them. Then we have a group less compact and satisfactory than either of these, composed of the Deltoides, the Pyralites, the Pterophorites. And having eliminated all these,—that is the Diurnes, the Nocturnes, the Geometræ and the Noctuæ, and lastly the compound but unnamed group of which Pyralis is the type, — we have still left on our hands that mass of moths which are now associated from their minute size and usually called Micro-Lepidoptera, but which are probably far more numerous, certainly more diverse, than any of those divisions to which I have alluded; and we have also left

those abnormal Psyches or Sackträgers which are bandied about from one division to another because they will amalgamate with none.

In "Sphinx Vespiformis" I hinted that the Psyches might be Phryganidous (see the diagram opposite page 21); and subsequently in the preface to the fifteenth volume of the 'Zoologist,' I raised the grave question, whether the Phryganidæ did not constitute a tribe of Lepidoptera. Now supposing this latter hypothesis to be correct, and it is certainly nothing more than hypothesis at present, we shall assuredly find the Sackträger larva represented among the Bombyces, just the same as we have the cuspidate type of larva, the limaciform type of larva, &c. According to my view, already partially explained, the existence of such groups as the true Nymphalidæ, the Lycænidæ, the Phryganidæ (if Lepidopterous), &c., all so strongly marked by the character of their larvæ, almost necessitates the reappearance of such larvæ in the central and most diversified division of the whole class. I have elsewhere stated my conviction that in such a great division as that of the endosteate animals the existence of such marked groups as fishes, reptiles and birds absolutely necessitates the existence of fish-formed sucklers, reptile-formed sucklers and bird-formed sucklers, otherwise the group associated by the character of suckling the young must be regarded as artificial and unnatural; but we all know how well this marked division bears this test: in the whale and the dolphin the fish is portrayed; in the pangolin and armadillo the lizard and the tortoise are portrayed; and in the bat the bird is portrayed. And this theory of representation is illustrated throughout every part of the animal kingdom, and must be regarded as an essential element in all attempts at natural classification. Thus the existence of Sackträger larvæ among the Lepidoptera, and their occasional appearance in forms least expected, as Perophorus, &c., furnishes a strong reason for assuming the existence of some extensive primary division of Lepidoptera, of which the Sackträger larva shall be the distinctive character. A curious and conflicting fact has lately been discovered in the economy of certain Psyches, that their larvæ are carnivorous; thus while the fact asserted by Pictet that the larvæ of Phryganidæ feed greedily on willow leaves, and thus exhibit a decided approach to the normal character of Lepidopterous larvæ, the larvæ of Psyches, according to the recent observations of Mr. Ealy, actually exhibit a discrepancy just where one would have wished an identity of economy. All these things must be considered in a much more comprehensive spirit than heretofore, or we cannot expect to arrive at truth.

The reflecting entomologist will pause before he accepts any scheme

for dividing these vast tribes by any hypothetical number; and should he peruse the labours of Dr. Horsfield he will find that that accomplished entomologist's attention was directed entirely to the larger insects—the Papiliones, Sphinges and Bombyces—and will, I think, not fail to conclude that Dr. Horsfield crowded together the Geometræ, Pyrales and Micro-Lepidoptera simply because he had not studied them.

This work, therefore, although containing the results of a long life's labour and study, can only be regarded, *first*, as furnishing us with unquestionable details of metamorphosis, and, *secondly*, as giving us a continuous and digested list of the Papiliones, Sphinges and Bombyces yet ascertained to be inhabitants of the East. This latter labour has devolved almost entirely on Mr. Moore, and I am sure every entomologist will appreciate highly the great industry, the sterling ability, and the extreme modesty with which his task has been accomplished.

Reverting to the divisions of the larger Nocturnes, it seems evident to those who desire thoroughly to understand them that the larva offers the best character for dividing them into groups; and if we give Dr. Horsfield's first group the meaning which its name implies, "Sphinx-formed," we shall then have eight perfectly natural divisions, and we shall find in each a heliophilous, a heliophobous and other intermediate groups, which may be indicated by placing them in parallel columns.

	Heliophilous Imago.		Heliophobous Imago.
Sphinges.	Macroglossa	Sphinx	Smerinthus
Lignivoræ.	Sesia	Hepialus	Cossus
Lithosiæ.	Zygæna	Nola	Lithosia
Ursinæ.	Glaucopis	Callimorpha	Chelonia

Linneus, misled by exclusive attention to the imago, placed all the heliophilous families in his genus Sphinx, as well as those which possessed the Sphingiform larva; and he thus included a portion of each natural division; so that Smerinthus, Sphinx and Macroglossa were Sphinges on account of the larva; Macroglossa, Sesia (Ægeria of Fabricius), Zygæna and Glaucopis were Sphinges on account of their imago; Macroglossa alone possessing a double claim. All the eight larval divisions of Nocturnes are probably susceptible of similar subdivisions, not indeed into three, but into several groups; but we are compelled to wait for a more perfect knowledge of their metamorphoses.

Those few entomologists who have glanced, even for the purpose of condemning it, at my septenary hopothesis, will recollect that Sphinx

formed one of my seven primary groups of Lepidoptera, a guess which I now believe to have been made under the influence of erroneous education, for who is there that does not entertain a belief in the primary importance of some such group? In "Sphinx Vespiformis" I reduced this group by eliminating all those families which did not possess the Sphingiform larva, and which Guenée has subsequently separated. I am now disposed to abandon it altogether, seeing in the family of Sphingidæ, as now restricted, nothing more distinctive or prominent than in the other families into which the Diurnes and Bombyces are by universal consent divided.—*E. N.*

'*The Honey Bee: its Natural History, Habits, Anatomy and Microscopical Beauties.*' By JAMES SAMUELSON. London: Van Voorst, Paternoster Row. 1860. 166 pp. letterpress; eight tinted Illustrations. Price 6*s.*

In this little work the author has gathered together many of the most amusing facts in the history of the honey bee, and has stated them with perspicuity and in an agreeable manner, but he appears to me to rely too entirely on the assertions of others, without taking sufficient trouble to investigate for himself: thus Mr. Samuelson states at p. 63 "that the queen bee is capable of producing and depositing fertile eggs in her virgin state, from which males alone proceed; in fact, it is now tolerably well established that the eggs wherefrom drones are hatched are in no case fertilized by the male element." This hypothesis has been broached by Dzierzon, restated by Siebold, and Siebold has been translated into English by Dallas; but so far from being tolerably well established it rests on the most vague conjecture. The very mention of such hypotheses must be confusing to the young, and for such only Mr. Samuelson's book is adapted.

At present, however, the state of bee lore is very unsatisfactory. As the juries for adjudicating prizes at the Great Exhibition of 1851 broadly pronounced every alteration made in the bee-hive during the last two hundred years to be a retrograde movement, so we may state that our knowledge of bee economy had been retrogressive also; and now that more able observers and more profound thinkers have turned their attention to the hive-bee, we find we have to unlearn almost all that we have learned. Bee literature is a perfect quagmire; there is safe footing nowhere, and Mr. Samuelson's little volume may be characterised as the well-intentioned attempt of a man in a quagmire to

extricate himself by leaning on the reeds. The mission of such books is to invite readers to observe for themselves.—*E. N.*

'*The Natural History of the Tineina.*' Vol. V; containing Coleophora, Part II. By H. T. Stainton, assisted by Professor Zeller, J. W. Douglas and Professor Frey. 228 pp. letterpress; 8 coloured plates. Price 12*s.* 6*d.*

I can say nothing in praise of this volume that I have not already said of its predecessors. The observations are invaluable, and the plates of the highest excellence.—*E. N.*

The New British Rat (Mus Alexandrinus).—In the 'Field' of the 1st of September I see reference made by Mr. Newman to a communication which I read before the Linnean Society some time since respecting a rat which had never before been recognised by any scientific naturalist as a member of the British fauna. My communication was not made to the Zoological Society six months ago, as stated by Mr. Newman, but to the Linnean Society two years ago, when I exhibited several living specimens of the new rat as well as some of the old English black rat (*Mus Rattus*), with which it had by some been confounded. On a subsequent occasion I read a further communication to the same Society, on the distinctive anatomical characters of the two species, especially in reference to their crania. I did not, as stated by Mr. Newman, "speak of the new rat as a novelty;" on the contrary, I mentioned that it had long been known by those who dealt in rats for sporting purposes, but it had, until then, eluded the search of scientific naturalists. Further, I said that the rat would probably turn out to be the Mus Alexandrinus of Geoffroy St. Hilaire, whose figure of that species it resembled. The species of rat now under consideration has long been known to the ratting fraternity as the "ship" rat, or "snake" rat, but is rejected by them on account of its extreme activity, which enables it to scale with a bound the walls of the ratting-pit. This rat is rather smaller than either of the other rats met with in this country. The tail is enormously long, and the ears exceedingly thin and large; the hair of the body is fine and silky, and varies in hue from blackish slate-colour to brown-gray. The thighs are very large and muscular, and doubtless it is this circumstance which enables the animal to bound with such agility. It is very fierce and voracious. That the rat mentioned by Mr. Francis Francis is the new one, and that it is the Mus Alexandrinus, is very probable, but if Mr. Newman were practically acquainted with the difficulty of making out with absolute certainty the specific limits of these cosmopolitan rodents, so subject to variety, so ready to cross-breed, he would, I think, speak a little more guardedly. I have not had an opportunity of comparing an English specimen with an undoubted Mus Alexandrinus from Alexandria, but one of the keepers at the Zoological Gardens, Regent's Park, tells me that some years since several were received from Alexandria, and they were exactly like my specimens. I have recently received some rats from one of the West India Islands; they inhabit and live upon the growing heads of certain palm trees. They are not, as far as external characters go, to be dis-

tinguished from the new British rat, and I believed them to be identical, though the West Indian rats average rather larger in size, and are more uniformly of a brown colour. The cranial characters scarcely bear out this idea. In the British Museum, among the stuffed British Mammalia, is a wretched specimen, wretchedly stuffed, of the new rat; but it is incorrectly labelled Mus rattus, the name of the old English black rat, with which I suspect it has long been confounded. The cranial characters of the two are, however, very different, and their differences are such as are not compatible with mere variety—they are specific. I may here mention that my paper on the cranial characters of these two rats, with figures of the skulls, will probably appear in an early number of the 'Proceedings of the Linnean Society.' About two years since I presented three specimens of the new rat to the Zoological Society; one of them died, but the other two are still living in the Society's gardens, and may be found in the small house for Mammalia not far from the fish house. The rats are in good health, but accidents appear to have diminished the length of their tails, and their ears are covered with warts. I cannot conclude this little communication without expressing my belief that our knowledge of the British rats is very imperfect and not a little confused. The different species breed together very freely, and the offspring will breed with either of the parent species, resulting in endless gradations between the two. The new rat breeds freely with the common brown rat (*Mus decumanus*), and, where they mingle, every shade of difference between each species may be found. We have in this country a black rat with a white chest, probably a variety of Mus rattus. In the British Museum there are two stuffed rats (chestnut coloured with white breasts), which were captured in Cambridgeshire, and which are either a distinct species or a very singular variety. A distinguished Irish naturalist, the late Mr. Robert Ball, believed there was still another species of rat in Ireland, which he named Mus Hibernicus. The numerous readers of the 'Field' might do much to clear up our uncertainty about doubtful species or varieties, and any specimens of rats exhibiting peculiarities or unusual appearances I should be very grateful for; and I may add that living specimens would be valued at the Zoological Gardens, Regent's Park.—*James Salter;* 1, *Plowden Buildings, Temple.*

[I reprint the preceding from the 'Field' newspaper because of its value in a Natural-History point of view, and having done so I cannot courteously omit to notice Mr. Salter's mention of my own name. My knowledge of Mr. Salter's still unpublished communication I admit to have been very limited, and I accept very gladly his corrections as to the name of the Society and the date of the reading. My statements and suggestions about the rat, which are really the gist of the matter, seem corroborated by Mr. Salter's interesting communication. A word, however, about the following paragraph seems necessary. "If Mr. Newman were practically acquainted with the difficulty of making out, with absolute certainty, the specific limits of these cosmopolitan rodents, so subject to variety, so ready to cross breed, he would, I think, speak a little more guardedly." Now I wish most distinctly to disclaim all idea of "making out with absolute certainty the specific limits" of the members of the rat family. Often as rats, black, white and brown, have been brought for me to decide the species, I have always declined doing so, otherwise than in such vague terms as "I think it must be the common brown rat." I have never expressed an authoritative opinion of my own, or felt much confidence in the opinion of others. I have seen in the same litter of rats individuals which appeared to be of the black, and others that appeared of the brown species. This admixture of the two colours has been explained away by supposing the

existence of occasional black varieties of the brown rat, and occasional brown varieties of the black rat; but if this be so the names implying colour are not simply inapplicable, but injurious to Science. Whether other characters are more constant than colour I will not pretend to say; I think such constancy of distinctive character has not been made out. I feel strongly inclined to think that geographical races, as the old English black rat, the brown Norway rat, the slender Alexandrian rat, and several others, have been somewhat too readily received as species, and to regard the facility with which these races interbreed, and the extreme fecundity of the hybrids, as evidence both of the unity of the species, and of the instability of the races. The same disposition to vary within certain limits is exhibited in most of our domestic animals, a fact so well known that we either preserve races or alter them at pleasure. Who that compares the bulldog with the grayhound can fail to find in every bone characters of distinction far more marked than between the fox and jackal; and it is only our knowledge of a multitude of facts bearing on the question that induces us to admit, without a moment's hesitation, that the bulldog and grayhound are races and not species. I may add that I have often thought that the confusion existing between race and species has, in some instances, led to the reception of those hypotheses which break down specific limits altogether; we are too apt to argue on this subject on the false assumption that we know how widely the individuals of a species can vary *inter se*: size, form and colour, as specific characters, are certainly set at nought by most of our domestic animals, and yet all naturalists will admit that the horse is as distinct a species as the ass, although one is so versatile, the other so constant in its characters. Supposing the mule to be a fertile instead of a sterile animal, the specific distinction between horse and ass would be very difficult to maintain; and it is thus with rats: supposed specific distinctions are in a multitude of instances broken down by the propensity of such supposed species to interbreed, and by the fertility of the progeny.—*Edward Newman.*]

The African Anteater.—A letter which I have just received from Mr. Thomas Ayres, of D'Urban, Natal, contains the following account of the capture of a specimen of the great South African anteater, which may be interesting to the readers of the 'Zoologist.' "I have lately preserved one of the large anteaters. It is a male, and weighed 61lbs. Its length is 4 feet 6 inches, but I should judge from the softness of its ribs that it was not full-grown. This specimen was shot at night on a neighbouring farm, and, being wounded in the shoulder, was chased to his burrow; a fire was then kept alight for the remainder of the night, which prevented the animal from escaping. Next day eight Caffres were mustered with spades, &c., and set to work to dig the wounded beast out, which they wholly failed in doing. The upper crust of the ground, about four feet in depth, was very hard, gradually becoming more soft and sandy as they proceeded downwards. The ant-bear, the whole time the digging was going on, was constantly heard below, working away with might and main, and although the Caffres worked hard they could not overtake him. The most curious circumstance is that in such cases the animal appears able to work its way to almost any distance under ground without requiring air, in its progression pressing the earth it has removed so forcibly back that it only occupies the same space it did before. How the animal can continue working in this way a whole day is wonderful; they may be said literally to walk through the earth. At sunset the work was given up, and a large gin tiger-trap set amongst the loose earth at the bottom of the pit which had been dug. Next morning the ant-bear had worked his way back and was caught in the trap, but in such a weak state from

the inflammation in the wounded shoulder that it was necessary to kill it. Twice I have been present at the attempt to dig anteaters out, and both times totally failed in overtaking them. Had this one not been wounded we certainly should not have got him."—*J. H. Gurney; Catton Hall, Norwich, September* 28, 1860.

The Ostrich in Europe.—At the last sitting of the French Academy of Science, Prince A. Demidoff wrote to announce a second instance of the reproduction of the ostrich in Europe, at his zoological establishment of San Donato. The same female ostrich, which, in 1859, had produced two young, had this year laid fourteen eggs; the first on the 11th of May, and then every second day one, until the 31st. A twelfth was laid on the 3rd of June, another on the 4th, and the fourteenth and last on the 5th. The female used to sit upon them for three hours daily, leaving to the male the onerous duty of sitting all the rest of the time. During a violent storm, however, which occurred on the 17th the female placed herself beside her mate, the better to protect the eggs from injury. The first bird made its appearance on the 23rd, and was soon followed by three more. A fifth broke its shell on the 24th, and a sixth two days later. The brood used regularly to pass the night under their parent's wing. There still remained eight eggs; but another storm having broken out on the 26th, the old birds became restless and quitted their nest, nor could they be prevailed upon to return to it. Five of these eggs were found to be in a fair way of being hatched, but the other three were addled. The two young ostriches hatched in 1859 were stated to be thriving, and to have already nearly attained the size of their parents. M. Geoffroy St. Hilaire took occasion to remark, after reading this communication, that from observations made at the Jardin des Plantes, where the cassowary of Australia had been reproduced, it was proved that it is the male and not the female that sits, just as in the case of ostriches. —*From the 'Field.'*

Capture of an Ashcoloured Shrike (Lanius Excubitor) *at Sea.*—I have just had sent me a specimen of the above bird which was taken in the rigging of a vessel on the 1st of this month, when about 60 miles from land. The ship was on her way from the Baltic to this country, and arrived at Fraserborough (a port on the N.E. coast of Scotland) two days afterwards. At Fraserborough the master of the vessel presented the bird, which was still alive, as a rarity to the chief officer of the Custom House. That gentleman had it put into a cage, and would have kept it, but it refused all sorts of food (*Query*, did it get the right sort?), and was otherwise so very wild that at last he had it killed, in order to preserve its plumage. It was then forwarded here for preservation, as also to see what sort of bird it was. I may add that on dissection it proved to be a male, and there is no doubt of its being an immature bird, that is a bird of the year.—*Thomas Edward; Banff, October* 8, 1860.

Capercally Breeding in Scotland, &c.—On the 26th of September, at the Birmingham Natural History Association, Mr. A. Franklin, taxidermist, exhibited a magnificent hybrid of the capercally (*Tetrao Urogallus*) and the black grouse (*Tetrao Tetrix*). It was shot this season in Perthshire, by a gentleman of our town, and placed in Mr. Franklin's hands for preservation. The leading characters of this bird are those of the capercally; the bill, however, is black. In 1852 a similar hybrid was shot in the same county. In 1857 a nest of nine eggs of the capercally was recorded in the 'Perthshire

Courier' as taken near Logielmond. Associating these facts, it seems evident an extirpation of the birds introduced by the Marquis of Breadalbane is not yet completely effected, and we hope may not be.—*George R. Twinn; The Elms, Birmingham, September* 29, 1860.

Occurrence of the Buffbreasted Sandpiper (Tringa rufescens) *near the Land's End.*—On the 8th instant Mr. Vingoe, naturalist, of this place, discovered, on some high moor ground near a pool, a very good specimen of this little sandpiper in apparently the first year's plumage. It exactly resembles in every respect the specimen which I gave you notice of, and which appeared in the 'Zoologist' some years since. That specimen was killed, I think, on the sea-shore near this place. It therefore appears that it does not confine itself to the tidal estuaries, but affects moorland marshes.—*Edward Hearle Rodd; Penzance, September* 26, 1860.

Occurrence of the Red Phalarope at Scilly.—On the 8th inst. a specimen of this small phalarope in adult winter plumage was observed swimming about in the freshwater lake at Trescow. It was shot after having been fired at and flushed on the wing several times, the bird showing, by its returning to the same spot, its characteristic tameness.—*Id.; October* 11, 1860.

Zoology of the Pratas Shoal, a Coral Reef in the China Sea.—During a survey of the dangerous reef of coral formation in the China Sea, named usually the Pratas Shoal (although not a shoal but a reef), I spent a day in exploring the natural productions of the little island which arises from the sunken portion of the great subcircular reef on the western side. It is a small island composed of coral and coral-sand, about a mile and a half long, and half a mile wide. It is covered with a dense scrub made up chiefly of Scariola lobelia. At the western end there is a salt-water lagoon running into it for nearly half a mile. The following enumeration of genera found on so small an island may be of use as illustrating the colonisation of coral islands.

List of Animals observed on Pratas Island.

Mammals. Rat, mouse.

Birds. Hawk, swallow, kingfisher, thrush, wagtail (two species), butcher-bird, cuckoo, pigeon, plover (two species), godwit (*Limosa*), padi-bird (*Ardea*), curlew, snipe, sanderling (two species), gannet.

Reptiles. Turtle, lizard (*Zootoca*).

Amphibians. None.

Fishes. None on the island itself, except a species of Periophthalmus in the lagoon.

Mollusks. Succinea, Melanopus, Truncatella.

Insects. Coleoptera: Opatrum, Chilocoris, Microzæum, Cryptocephalus, Haltica, Dermestes (in dead gannets), Calandra, Brachelytra (two species). *Orthoptera:* Forficula, Blatta (two species), Mantis, Acheta, Gryllus, Locusta, Truxalis. *Neuroptera:* Libellula. *Hymenoptera:* Formica (three species), Andrena. *Lepidoptera:* Sesia (large species), a moth with white wings common on Scavida, Tinea (small species) on leaves. *Hemiptera:* two species of sand-bug and one shield-bug. *Diptera:* three or four kinds of flies.

Myriapods. Geophilus (under masses of Madrepore).

Arachnidans. Lycosa, Walckenaera, Gastracantha, Thomisus, Saltica (four species), Scorpio (common under dead stems and leaves).

Crustacea. Oxypoda (two species), Thelphusa (two species), Oniscus (two species).

Annelides. Lumbricus (under dead coral-masses on the shores of the lagoon).—*Arthur Adams.*

On the Probable Origin of some Sea Serpents.—An incident occurred on board the vessel of which I am surgeon which, I think, deserves to be recorded as an illustration of optical delusion that might have become a source of error, and given rise to yet another sea serpent. We were sailing among the Islands of the Miatan group, at the entrance of the Gulf of Pe-chili. There was little wind, and gentle ripples covered the surface of the sea. I was sipping my Congo at the open port of the ward room on the main deck, admiring the setting sun, and watching the rounded outlines of the blue mountains and distant islands against the sky, and the numbers of sea-birds "wheeling rockwards to their nests," when my eye rested on a long dark object apparently making its way steadily through the water. After observing it sometime in silence I was sorely puzzled and could make nothing of it. It was neither a seal nor a diver nor a fishing cormorant, for with their forms I was familiar; so I went on deck and consulted other eyes than mine. Sundry glasses were brought to bear on the suspicious object, and the general scrutiny seemed to decide that it was a large snake, about ten feet long (or much longer according to some), working its way vigorously against the tide by lateral undulations of the body. So strong was this conviction that the course of the ship was altered, and a boat got ready for lowering. With a couple of loaded revolvers, some boathooks and a fathom or so of lead-line, I made ready for the encounter, intending to range up alongside, shoot the reptile through the head, make him fast by a clove-hitch, and tow him on board in triumph! By this time, however, a closer and more critical inspection had taken place, and the supposed sea-monster turned himself into a long dark root, gnarled and twisted, of a tree, secured to the moorings of a fishing net, with the strong tide passing it rapidly, and thus giving it an apparent life-like movement and serpentine aspect.—*Arthur Adams; April* 27, 1860.

Singing Fish.—That part of the interesting letter from Dr. Buist, in the 'Athenæum,' relating to the voice of fishes, has induced me to send you this note. The River Plate swarms with fish, and is the habitat of one possessed of a very sonorous voice, like that found in the River Borneo—the account of which is quoted by Dr. Buist from the 'Journal' of the Samarang. During the years 1845-6 H.M.S. Eagle was stationed in the River Plate, and anchored about three miles from Monte Video, with an occasional change a little higher up the stream, or lower down, as far as Maldonado. During my service on board that ship I have often heard a loud piscatory chorus during the night. My cabin was in the after part of the gun-room; and when lying in bed with the "scuttle" open (a small window about six feet from the surface of the river) I have listened with pleasure and curiosity to the loud sounds proceeding from these creatures as they roamed in numbers round the ship. The noise they made was at times very loud and close at hand, and seemed to proceed from many voices—receding now and then, and becoming lost in the distance, and again returning. At other times,

as far as I could judge, a solitary voice was heard, and then a few together. There was little variation in the sound, which was of a deep tone, more like the rumbling of a drum or organ than anything else. Nevertheless, whether it was fancy or not, there was something pleasing, and even musical, in the sounds as they became slowly or suddenly distant or near, with the retreat or approach of the band. I have no doubt that this drumming sound came from one of the Sciænoids, probably akin to the Pogonias; but the fish was never seen or caught near the ship where its voice was heard. Amongst the numerous varieties of fish brought on shore on hauling the seine at Maldonado Bay, several were occasionally caught resembling the Pogonias Chromis, varying in weight from 40 to 60 lbs.—*From the 'Athenæum.'*

Singing Fish.—On the broad expanse, or bay of the Tagus, which extends from Cacilhas-Point to Aldea-Gallega, I have heard proceed from the water (and apparently close under the boat), on several occasions, sounds resembling the vibrations of a deep-toned bell, gong or pedal-pipe of an organ. The boatmen seemed to know them well, and generally exclaimed "The Corvina!" This is a large fish with black fins, which is, I believe, to be met with occasionally in the Lisbon market.—*Id.*

The Mollusca of the Firth of Clyde. By the Rev. Alfred Merle Norman, M.A.

(Continued from p. 7213.)

Fam. XIV. *Naticidæ.*

Natica monilifera. Sandy beaches and bays; but not common.

*N. nitida (*Natica glaucina* and *N. Alderi*). Common; the specimens are mostly of small size.

N. sordida. This species is recorded by Forbes and Hanley as having been taken, by Mr. M'Andrew, "off Arran, in Scotland, in twenty-five fathoms." The specimens, which I have seen, I find were taken on the western side of Arran—that is, in Kilbrannan Sound, and not in the district under consideration. I have also myself procured the species in Loch Fyne, so that it will probably be hereafter met with in the Firth of Clyde.

N. Montagui. Common in the deeper parts of the laminarian and in the coralline zone among nullipore. The specimens mostly small.

Fam. XV. *Velutinidæ.*

*Velutina lævigata. A few specimens near the Tan Buoy, Cumbrae, and in Lamlash Bay. It appears scarce. Mr. Hennedy meets with it at Gowrock, *Naturalist*, vol. ii. p. 88, 1852.

Lamillaria perspicua (*Cariocella perspicua*). One living specimen from the large rock-pool at the Allans, Cumbrae. Dr. Landsborough recorded it from Lamlash.

L. tentaculata (*Sigaretus haliotoideus*). Clyde, *Smith.* Mr. Roger Hennedy, in a paper read before the Glasgow Natural History Society, mentions this species, among a few others, found at Gowrock, and says it "is found in May beneath stones, where it probably comes at that season to deposit its spawn."—*Naturalist*, vol. ii. p. 88.

Fam. XVI. *Cancillariadæ.*

Trichotropis borealis (*Fusus umbilicatus*). This interesting species, remarkable for the epidermal bristles with which it is adorned, occurs sparingly in the coralline zone throughout the district. Mr. Smith published the shell from the Clyde under the name of "Fusus umbilicatus," but the species had shortly before been described by Broderip and Sowerby.

*Cerethiopsis tubercularis (*Cerethium tuberculatum*). Alive in rock-pools at Allan and Cumbrae, and dead in shell-sand. I met with an unusually large specimen in a rock-pool at Clachland Point, which measured five lines long and one line and a half broad; it had fourteen whorls remaining, and at least three more had been broken off.

Fam. XVII. *Muricidæ.*

*Purpura lapillus. Clyde specimens are mostly white or yellowish white.

*Nassa reticulata (*Buccinum reticulatum*). Rare. I have taken two or three specimens, but they had a very unhealthy look, as though the locality did not suit them.

N. incrassata (*Nassa macula*, *Buccinum macula*). Common.

*Murex erinaceus. Bute, Ayr, *Smith.*

*Buccinum undatum (*Buccinum anglicanum* and *B. carinatum*). Common.

*Fusus antiquus. Not common in the district.

F. norvegicus. Bute, *Smith.* Was it fossil?

F. islandicus (*Fusus corneus*). I have taken two or three examples off the Tan Buoy; and it is more abundant in deep water off the north-east end of Little Cumbrae. "Near Fullerton's Rock in twenty fathoms," *Greville and Miles.*

*Trophon clathratus (*Fusus Bamfficus*). Clyde, Bute, *Smith.* Lamlash, *Landsborough.*

T. bervicensis. Included as a Lamlash shell in Dr. Landsborough's last corrected catalogue of the Mollusca of the Bay.

Fam. XVIII. *Conidæ.*

*Mangelia turricola (*Pleurotoma* and *Fusus turricolus*). Scarce in Lamlash Bay. Ayr, Bute, *Smith.*

M. rufa (*Fusus rufus*). Lamlash, *Landsborough.* *Var.* ulideana. "Between Fullarton's Rock and King's Cross Point; only one specimen obtained," *Greville and Miles.*

M. sepangularis (*Fusus septangularis, Pleurotoma septangularis*). Rare at Lamlash. Ayr, Bute, *Smith.*

M. teres. I have dredged one living example of this beautiful Mangelia on the bed of old rotten scallops described under Ptilidium fulvum. Messrs. Greville and Miles took three specimens in Lamlash Bay.

M. Trevelliana (*Pleurotoma sinuosa*). The Pleurotoma sinuosa is said by Mr. Smith to have occurred at Ayr.

M. purpurea (*Fusus purpureus, Pleurotoma purpurea*). A few specimens between Clachland Point and Holy Island. I once met with a dwarf form in some numbers in the large rock-pool of the outer Allans.

M. Lefroyi (*Fusus Boothii, Pleurotoma Boothii*). This species was first described as British from specimens taken by Mr. Smith and Professor Forbes in Lamlash Bay, Cumbrae. It is frequent in other parts of the Clyde, also among nullipore in the coralline zone.

M. linearis (*Fusus linearis, Pleurotoma linearis*). Not uncommon alive in Lamlash Bay, Cumbrae.

M. gracilis (*Fusus gracilis, Pleurotoma elegans*). "Clyde in fifteen to twenty fathoms," *M'Andrew.* Lamlash, *Landsborough.*

M. nebula (*Fusus nebulus*). Clyde, Bute, *Smith.* Lamlash, *Landsborough.*

M. striolata (*Pleurotoma Smithii*). Rare near Cumbrae. It has also been taken by Mr. Smith and Professor Forbes "in twenty fathoms," *Forbes and Hanley.*

*M. costata (*Fusus costatus, Pleurotoma costata, Pleurotoma coarctata*). Occasional in deep water.

M. attenuata (*Fusus attenuatus*). Inserted in Dr. Landsborough's lists, but probably in error. Mangelia striolata was probably mistaken for it, as that species does not occur in the lists, at pp. 160 and 363, of the 'Excursions' which give Fusus attenuatus.

Fam. XIX. *Cypræadæ.*

Cypræa europæa (*Bulla candida, B. diaphana*). Frequent.

Ovula acuminata (*Bulla acuminata*). Has been dredged in Lamlash Bay by Mr. Alder (*Forbes and Hanley*) and Dr. Landsborough.

Marginella lævis (*Marginella voluta*). Ayr, *Smith.*

Div. II. Opistholbranchiata.

Fam. XX. *Bullidæ.*

*Cylichna cylindracea (*Bulla cylindrica, B. cylindracea, Volvaria cylindrica*). Occasionally dredged near Cumbrae, and in Lamlash Bay. Bute, *Smith.*

C. truncata (*Bulla truncata, Volvaria truncata*). Abundant in rock-pools, apparently in all parts of the Clyde; and very common dead in shell-sand.

*C. obtusa (*Bulla obtusa*). Lamlash, *Landsborough.*

C. mamillata (*Bulla mamillata*). Frequent among shell-sand from Landsborough's Bay.

C. umbilicata (*Bulla umbilicata*). Rare, Lamlash Bay.

"To this genus belongs the Volvaria alba of Brown (Ill. Conch. G. B. p. 3, pl. 19, fig. 43, 44), said to have been found at Greenock, and usually supposed to be (as British) a fossil species."—*Forbes and Hanley.*

Amphisphyra hyalina (*Bulla hyalina, B. pellucida, Bullæa minuta*). Widely distributed throughout the district in rock-pools at spring tides.

Tornatella fasciata (*Tornatella tornatilis*). I have taken a specimen or two to the west of Cumbrae, and also in Lamlash Bay. Ayr, Bute, *Smith.*

Akera bullata (*Bulla akera*). Scarce in Lamlash Bay. Ayr, Bute, *Smith.*

Bulla Cranchii. I dredged a single very fine specimen of this shell in deep water outside of Lamlash Bay.

Scaphander lignarius (*Bulla lignaria*). Abundant in Kames Bay, and, in deeper water, about twenty-five fathoms off the Allans, Cumbrae; also at Lamlash. Ayr, *Smith.* At Whiting Bay, in Arran, it may be taken by "digging in the sand at ebb-tide," *Landsborough.*

Philene aperta (*Bullæa aperta*). Not common, and always small, Cumbrae and Arran. Ayr, *Smith.*

P. punctata (*Bullæa punctata*). Lamlash, *Landsborough.*

P. Catena (*Bullæa catenata, B. catenulifera*). Lamlash, *Landsborough.* I dredged a living example of either this or the last

species off the Clerk Rock, Millport, but the specimen was unfortunately lost before it had been examined.

P. scabra (*Bullæa pectinata*). Rare; I have only met with it outside the northern entrance of Lamlash Bay.

Fam. XXI. *Aplysiadæ.*

Aplysia hybrida. Young specimens in rock-pools at Cumbrae.

Fam. XXII. *Pleurobranchidæ.*

Pleurobranchus Plumula. Maybole, *Smith.*

P. ——— ? "Holy Island, at low water, found four individuals under stones; probably they are Pleurobranchus membranaceus."—*Greville and Miles.* It is more likely that they were P. Plumula, the species recorded by Mr. Smith, and which was found in the Isle of Man by the late Professor Forbes. P. membranaceus is essentially a southern species.

Fam. XXIII. *Doridida.*

Doris tuberculata. Low water, Cumbrae, and at Lamlash.

D. flammea. I dredged a fine specimen in deep water to the west of Cumbrae. Rothesay Bay, *Alder.* Lamlash, *Landsborough.*

D. Johnstoni. Taken by Mr. Alder in Lamlash and Rothesay Bays.

D. planata. Found by Mr. Alder when dredging in company with Dr. Landsborough in Lamlash Bay; it has not again been met with.

D. aspera. Rothesay, *Alder.*

D. bilamellata. Lamlash Bay, *Landsborough.* "Found under stones at low water on Holy Island."—*Greville and Miles.* I have also met with it at Cumbrae.

Goniodoris nodosa. "Ardrossan; plentiful near the Inch."—*Alder in litt.* "One example on Holy Island."—*Greville and Miles.*

G. castanea. "Saltcoats, Mr. D. Landsborough, jun."—*Alder and Hancock.*

Triopa claviger. Common in the large rock-pool of the outer Allans, and other parts of Cumbrae; also at Lamlash.

Ægirus punctilucens. "Ardrossan and Isle of Man, Mr. Alder."—*Alder and Hancock.*

Polycera quadrilineata. Lamlash, *Greville and Miles.* Cumbrae Island, Rev. D. Landsborough, *Alder and Hancock.* I have frequently dredged it in the same locality.

P. ocellata. Lamlash, *Landsborough.*

Fam. XXIV. *Tritoniadæ.*

Tritonia plebeia. Rothesay Bay, *Alder and Hancock.*

Fam. XXV. *Æolididæ.*

Lomonotus flavidus. "We obtained the only known example of this species on a small Antennularia brought up by the dredge in from three to four fathoms water in Lamlash Bay."—*Alder and Hancock.*

Lomonotus ——— ? Messrs. Greville and Miles dredged a Lomonotus "in Brodick Bay, between Invercloy and the Corrriegills, in from ten to fifteen fathoms." From the description sent by them to Mr. Alder, he considered it probably new, but the specimen was unfortunately lost before any account of it was drawn up. The example was two inches in length, "white with orange processes," and differed from L. flavidus in the "length of the velafilaments, and the expansion of the posterior extremity."

Dendronotus arborescens. Lamlash, *Landsborough.*

Doto coronata. Lamlash, *Landsborough;* and I have dredged it to the west of Cumbrae.

D. fragilis. Cumbrae and Arran.

Æolis papillosa. Lamlash, *Alder.*

Æ. coronata. Common under stones at low-water at Cumbrae and Arran; and Mr. Alder has taken it at Rothesay.

Æ. Drummondii. In similar situations to the last, and equally common.

Æ. rufibranchiata. Lamlash, Rev. D. Landsborough, *Alder and Hancock.*

Æ. lineata. Saltcoats, Rev. D. Landsborough, *Alder & Hancock.*

Æ. smaragdina. An Æolis which I procured at Cumbrae came nearer to the description and figures of this species than any other in Alder and Hancock's work. It, however, differed in certain particulars, which I cannot now recall to mind.

Æ. Landsburgi. I have taken this lovely species at Cumbrae. It was first met with by Mr. Landsborough, jun., at Saltcoats.

Æ. alba. Rothesay Bay, *Alder and Hancock.* Lamlash, *Landsborough.* Isle of Cumbrae.

Æ. olivacea. Rothesay Bay, *Alder and Hancock.* Lamlash, *Landsborough.*

Æ. aurantiaca. Taken by Mr. Alder at Ardrossan, *Alder and Hancock.*

Æ. glottensis. "We procured a single specimen of this Æolis in June, 1846, while dredging in company with our friends, the Rev. Dr. Landsborough and his son, in Lamlash Bay, Isle of Arran."—*Alder and Hancock.* "Glotta" is the Latin name for Arran.

Æ. viridis. "At low-water mark, Saltcoats and Portincross, Ayrshire, Rev. D. Landsborough, jun."—*Alder and Hancock.*

Æ. amethystina. Lamlash, *Landsborough.*

Embletonia pulchra. Rothesay Bay, Alder; Saltcoats, Rev. D. Landsborough, *Alder and Hancock.*

Runcina Hancocki. Rock-pools, Farland Point, Cumbrae, in company with the Limapontia.

Fam. XXVI. *Elysiadæ.*

Elysia viridis. Common in rock-pools in all parts of the coast that I have examined.

Fam. XXVII. *Limapontiadæ.*

Limapontia nigra. Abundant in rock-pools at Farland Point, Isle of Cumbrae.

Div. III. Pulmonifera.

Fam. *Auriculidæ.*

Conovulus denticulatus (*Voluta denticulata*). This species is inserted in Mr. Smith's catalogue without locality. It may therefore only have been found by him in the north east of Ireland, whence I have received specimens.

C. bidentatus (*Voluta bidentata*). I have procured a few examples from shell-sand dredged in Lamlash Bay. Mr. Smith also records it from Bute.

Class V. CEPHALOPODA.

Div. Dibranchiata.

Fam. I. *Octopodidæ.*

Eledone cirrhosus (*Octopus octopodia, Eledone octopodes*). Ayr, *Smith.* Lamlash, *Landsborough.*

Fam. II. *Teuthidæ.*

Loligo media. Maybole, *Smith.*

Fam. III. *Sepiadæ.*

Sepia officinalis. Ayr, *Smith.*

Addenda.

Molgula ———? I dredged a species, which may perhaps be M. rustica, in great abundance in 1857, between Clachland Point and the Corriegills. It occurred in deep water. Further observation is required to identify the species.

Pholas candida. In "An Account of a Day's Excursion to Bute, by James P. Fraser, Esq.," a short paper published in the 'Naturalist' (vol. i. 1851, p. 127), I find the following reference to this shell as occurring at Rothesay:—"The state of the tide precluded our getting at the ground where Pholas candida is very abundant; but we were not much too late, for one of our party, who in his enthusiasm had rushed into the water, said he was standing on the bank which contained them." Mr. Fraser does not appear to have procured specimens, and an error may have been made with respect to the species.

Lyonsia norvegica. "Between Holy Island and Clachland Point."—*Greville and Miles.*

Tapes pullastra. "Holy Island, &c."—*Greville and Miles.*

The following names occur in Mr. Smith's 'Catalogue,' which I find it impossible to recognise as synonyms of our admitted species:—Tellemya ovata, *Brown*, perhaps a form of Kellia suborbicularis; Amphidesma ovale; Tellina punicea, exotic; Crassina depressa, fossil? (*vide* Forbes and Hanley, vol. i. p. 471); Venus sulcata, exotic (*vide* Forbes and Hanley, vol. i. p. 470); Cardium medium, exotic?; Lima sinuosa, synonym of Lima hians?; Pecten medius; Turbo olivaceus; Pyramis pallidula; Cerethium elegans, exotic.

The following in 'Landsborough's Excursion' present similar difficulties:—Crania spiralis; Cardium medium; Turritella ambigua; Helix bicolor, probably one of the Skeneæ; Cerethium elegans; Rissoa scalariformis.

Of the Mollusca referred to in this Catalogue the following seventeen may safely be considered to have been erroneously recorded as denizens of the Clyde:—

Panopæa norvegica	Pecten islandicus
Venus verrucosa	Trochus exiguus
Astarte arctica	„ crassus
Cardium aculeatum	Ianthina communis.
Leda oblonga	Rissoa abyssicola
„ truncata	Chemnitzia clathrata

Chemnitzia eximia
Truncatella Montagui
Natica sordida
Fusus norvegicus
Mangelia attenuata

The right of the seventeen species in the next list (and perhaps one or two others also) to be admitted may also be questioned, and their retention must be dependant on the results of future investigation.

Pholas candida
Thracia pubescens
Solen marginatus
Syndosmya tenuis
Pecten niveus
Trochus Alabastrum
Rissoa costulata
„ semistriata
„ rubra
Rissoa vitrea
Odostomia plicata
Murex Erinaceus
Mangelia Treveliana
Marginella lævis
Pleurobranchus membranaceus.
Æolis smaragdina
Conovulus denticulatus

It must be borne in mind that the difficulties which a naturalist had to contend with before the publication of 'The British Mollusca' were very great, and errors in nomenclature consequently frequent, even in the best cabinets; and this was especially the case with respect to the more critical and minute species. The exotic shells—unless the errors consisted in nomenclature—and the South British forms may have been transported to the Clyde in ballast, a most prolific source of aliens in years gone by, while five of the species formerly admitted were post-tertiary fossils.

Excluding the thirty-four above-mentioned species from the list, the number of Mollusca inhabiting the Firth of Clyde will be found to be three hundred and five.

The "Clyde Province" may be divided into three subprovinces:—1. The Firth of Clyde; 2. Loch Fyne (including Kilbrannan Sound); 3. The North Channel. The first of these subprovinces forms the subject of the present paper. Subjoined are lists of the Mollusca which have been met with in the last two subprovinces, but which have not as yet been noticed in the Firth of Clyde.

Loch Fyne.

Cynthia quadrangularis
*Neæra costellata
* „ abbreviata
Pandora obtusa
Tellina proxima (fossil)
*Syndosmya intermedia
*Lucina ferruginosa
Nucula decussata

* These species have been met with by myself; the rest are inserted on the authorities given by Forbes and Hanley.

*Pecten furtivus (*Loven*)
Scissurella crispata
*Rissoa zetlandica
* „ sculpta
„ crenulata
* „ abyssicola
Eulima bilineata
*Chemnitzia fulvocincta
Odostomia acuta
Odostomia insculpta
*Eulimella Scillæ
„ acicula
„ affinis
*Natica sordida
Velutina flexilis
Cylichna nitidula
„ strigella
Philene pruinosa

THE NORTH CHANNEL.[a]

Sidnyum turbinatum
Amouroncium proliferum
Leptoclinum maculosum
„ asperum
Distoma rubrum
Botryllus polycyclus
„ gemmeus
„ smaragdus
„ bivittatus
Ascidia scabra
„ aspersa
„ conchilega
Cynthia claudicans
Teredo nana
„ cucullata (*Norman*)
„ fimbriata (*Jeffreys*)
Pholas parva
„ candida
Pholadidea papyracea
Solecurtus candidus
Modiola Tulipa
Pecten furtivus (*Loven*)
†Terebratula capsula (*Jeffreys*)
Argiope cistellula
Chiton albus
„ Hanleyi
„ cancellatus
Trochus striatus
„ cinerea (*Gould*)
†Phasianella pullus
Ianthina communis
†Lacuna crassior
„ labiosa (*Loven*)
Littorina fabalis
†Rissoa crenulata
† „ Calathus
Cerethium niveum (*Jeffreys*)
Chemnitzia scalaris
„ rufa
†Eulima bilineata
Odostomia alba
„ conspicua
„ truncatula
„ Gulsonæ
Natica helicoides
† „ clausa (*Brod. and Sow.*)
Cerethiopsis pulchella (*Jeffreys*)
†Murex Erinaceus
Nassa pygmæa
†Astyris Holböllii (*Müller*)
†Trophon clathratus
† „ scalariformis (*Gould*)
Mangelia Treveliana
„ reticulata (*Philippi*)

[a] The waters of the coast of Antrim extending northward to the Mull of Cantire and Arran.

† The species thus marked are in my own collection. The Tunicata and Cephalopoda are on the authority of Mr. W. Thompson. The testaceous forms are chiefly extracted from Mr. Jeffrey's recent "Gleanings" in the 'Annals of Natural History.' A few also together with the Nudibranchs from Forbes and Hanley. For Odostomia conspicua and Ovula patula see 'Natural History Review,' vol. vi. "Proceedings of Societies," pages 79 and 85.

Ovula patula
Cylichna Lajonkaireana (*Bast.*)
„ nitidula
Philene quadrata
Doris ulideana
Æolis tricolor
Hermæa bifida
Conovulus albus
Sepiola atlantica
Rossia macrosoma?
Loligo vulgaris
Ommastrephes Eblanæ
Spirula Peronii

I am of opinion that the Arctic Mollusca (*Natica clausa*, *Astyris Holböllii*, *Lacuna labiosa*, *Trophon scalariformis*, &c.), which have recently been dredged on the Turbot Bank off Larne, and have created so much interest, must be regarded as fossil. Although the shells are in a beautiful state of preservation, they show symptoms of having been washed to their present site from a matrix of red shelly marl. In some specimens the marl may be found still within the mouth; in almost all, signs of it may be seen in the red stains of the suture. Even as fossil they are highly interesting, as indicating a bed different in character from any yet discovered; but shown by the character of the shells found to belong to the glacial period.

If the Mollusca met with in Loch Fyne and the North Channel be added to those of the Firth of Clyde, the number of species hitherto taken in the whole "Clyde Province" amounts to three hundred and ninety-four.

Several of the rarest species of the Firth of Clyde are much more abundant in the other subprovinces.

There can be little doubt that there are several species yet to be discovered in the Firth of Clyde, and probably careful dredging in the mid-channel between Arran and Ayrshire would be rewarded by the finding of some of the deep-water Loch Fyne forms.

Alfred Merle Norman.

Sedgefield, Ferry Hill,
October 9, 1860.

Errata.—Page 5876, line 34, for "Veniorupis" read "Venerupis" Page 5877, line 12, for "striata" read "striatula" Page 5878, line 12, for "Bay;" read "Bay." Page 5882, line 28 and line 32, for "trians" read "hians" Page 5884, line 13, dele "coast" Page 7203, line 26, for "B. lævis" read "C. lævis" Page 7204, line 5, for "skin" read "spire" Page 7207, line 28, for "common;" read "common." Page 7208, line 14, for "Eulenia distorta" read "Eulima distorta" Page 7209, line 11, for "Lamlash;" read "Lamlash." Page 7210, line 22, for "had" read "have" Page 7211, line 12, for "elathrus" read "clathrus" Page 7211, line 19, for "Adis" read "Aclis" Page 7212, line 25, for "Halichondria favinaria" read "Halichondria farinaria" Page 7212, line 31, for "Lover" read "Loven"—*A. M. N.*

Reported Occurrence of Lycæna Acis in Epping Forest.—I am happy to inform you that I captured a specimen of Lycæna Acis last Friday, August 31, in Epping Forest. Although slightly damaged it is in other respects a very fair specimen. As Mr. Newman, in his excellent "Butterfly Number of Young England," says the species is not now obtained, this announcement may be interesting to some of my young friends.—*W. Banks; 5, George's Terrace, Copenhagen Street, Islington, September* 3, 1860.—'*Young England.*'

[Will Mr. Banks oblige me by bringing the specimen to this office to have this interesting statement verified?—*Edward Newman.*]

Pupæ of Sphinx Convolvuli.—A considerable number of the pupæ of Sphinx Convolvuli have again been dug up in the potato fields in the South of England; and I am indebted to Mr. Bond for a very fine specimen for the cabinet of the Entomological Club. Entomologists finding these pupæ in potato fields are earnestly requested to observe whether the Convolvulus arvensis or any other plant is growing among the potatoes.—*Edward Newman.*

Capture of Chærocampa Celerio at Darlington.—I have a fine specimen of this insect, which was taken here on Sunday last, off a window-ledge, by a friend of mine, and was given to me.—*W. Beadnell; Northgate, Darlington.*—'*Intelligencer.*'

Capture of Chærocampa Celerio at Matlock.—A fine specimen of this insect was taken at Matlock, on the 20th ult., by a gentleman, at whose house I saw it last week. It was fluttering in the long grass and herbage beneath a clump of fir trees, about six o'clock in the evening, having evidently just emerged from the pupa state. My friend put his hat over it, but having no net or box at hand he was obliged to grasp it rather roughly with his fingers, nip it beneath the wings, and pin it with a lady's common shawl-pin.—*F. Tearle; Grammar School, Kettering, October* 5, 1860.—*Id.*

Capture of Chærocampa Celerio at Nottingham.—On Saturday evening last a party of workmen brought a large moth to the Museum of the Natural History Society for identification. Their capture was eagerly compared with the occupants of the case, and, to the evident delight of its owners, found to tally exactly with Chœrocampa Celerio, with the exception that it had "no horns." It had been taken in a factory in the town, into which, from the partiality of its species for light, it had no doubt been attracted by the glare of what the Lancashire operatives term "the manufacturer's sun," too close contact with which had probably deprived it of its antennæ.—*September* 24, 1860.—*Id.*

Capture of Chærocampa Celerio at Wakefield.—At the meeting of our Naturalists' Society on Thursday last, a splendid living specimen of Chœrocampa Celerio, as if just emerged from the pupa, was exhibited by Mr. Talbot. It was in excellent condition, and did not appear to have made use of its wings.—*H. S. Roxby; Wakefield, October* 1, 1860.—*Id.*

Capture of Sphinx Celerio at Beccles.—I saw a beautiful specimen of Sphinx Celerio in the shop of Mr. Steel, chemist, of Beccles: it entered the shop, attracted by the light, and settled on a door.—*W. Winter; Aldeby, October* 15, 1860.—*Id.*

Occurrence of Sesia Spheciformis in Sussex.—A friend of mine having taken an extremely fine female of Sesia Spheciformis in Sussex, was kind enough to conduct me to the locality, where I had the good fortune to secure a second specimen, also a female, as it was flying lazily over the fern: the date was the middle of July, probably

a month later than usual, owing to the backwardness of the season.—*Frederick Bond; 24, Cavendish Road, October* 19, 1860.

Description of the Larva of Rumia cratægata.—Rests in nearly a straight posture, the head slightly bent downwards. Head small, slightly notched on the crown, curiously impressed on the face, the impression being double—that is, a small triangular depression within a larger and vaguer one: a large erect nipple-shaped hump, like a horn, on the back of the 7th segment; two small distant warts on the back of the 8th, and two rather larger ones on the back of the 9th; two abortive claspers beneath the 8th segment, and two small but still useable claspers beneath the 9th; a fringe of fleshy tubercles on each side between the 10th and 13th segments; these seem appressed to the twig when the larva is at rest. Colour very inconstant, varying from green to brown, but generally opaque brown. Feeds on Cratægus oxyacantha (white-thorn). There appear to be two broods of this insect; I have had the larva full fed in June, September and October.—*Edward Newman.*

Description of the Larva of Eurymene dolobraria.—Head divided into two obvious portions, indented on the crown, but not bifid: body with the 3rd segment evidently incrassated or tumid; the 9th with a transverse dorsal swelling; there are no other warts or excrescences either on the back or belly. Colour dark sombre brown, with two distant white dots on the back of the 4th, 5th, 6th, 7th, 8th and 10th segments; spiracles black, but the region around the spiracles rather paler, indistinctly mottled with gray. Feeds on Betula alba (birch); full fed on the 2nd of October; draws the leaves of the food-plant together, and changes to a pupa in the interior; remains a pupa all the winter. I am indebted to Mr. Thomas Huckett for this larva, as well as for the three which follow.—*Id.*

Description of the Larva of Selenia illunaria.—Head porrected, body when at rest bent back at the 4th segment; the 3rd segment rather tumid at the sides; the 4th rather tumid beneath, the 3rd pair of legs being seated in the swelling; 8th and 9th segments have each a pair of acute, approximate humps on the back. Body bright rust-coloured, but neither uniform in tint as regards a number of individuals, nor of uniform colour in the same individual, there being numerous shades and tints too various and too inconstant to describe; on the back of the 6th segment are two very distinct yellow spots. Feeds on Betula alba (birch), and is double-brooded; the second brood is full fed at the end of September; it spins a slight cocoon among the leaves, and remains in the pupa state all the winter.—*Id.*

Description of the Larva of Selenia lunaria.—Rests in a curved posture and oscillates the anterior part of the body when disturbed. Head not perceptibly notched; body singularly humped; 3rd segment tumid, having on each side a large subdorsal hump; 4th segment rather tumid below, the legs on the swollen portion; 6th segment with a large transverse dorsal hump, and a smaller obtuse lateral hump on each side; 7th segment with two dorsal warts and a large lateral hump on each side; 8th with two dorsal warts; 9th with a large dorsal hump, having a double indentation on its summit; 12th with two approximate small dorsal warts: colour green, gray or brown, with scarcely any variety of shading. Feeds on Quercus Robur (oak); full fed in Sept.; spins a few leaves together, and remains in the pupa state throughout the winter.—*Id.*

Description of the Larva of Selenia illustraria.—Head porrected; body when at rest bent back at the 4th segment, which is rather tumid beneath, the third pair of legs being seated on the swelling; the back is bowed and the figure altogether very singular; the 5th and 6th segments have each two small humps on the back; the 8th

and 9th have each four small humps ranged in a transverse linear series; the 12th segment is full and square on the back, but not humped. The colour of this larva is rich purple-brown, varied with beautiful tints of orange-brown and pearly gray, reminding one very forcibly of the exquisite colouring of the perfect insect. Commonly found feeding on Betula alba (birch), but eats the leaves of other trees, and in captivity feeds voraciously on Salix capræa (sallow): it is double-brooded, the first brood of larvæ being full fed on the 5th of July, the second at the end of September; it fastens together the leaves of its food-plant by a few silken threads, and changes to a pupa in the cot thus produced. See a description of this larva by Mr. G. F. Mathew, at page 6789 of the 'Zoologist.'—*Edward Newman.*

Capture of Dosithea eburnata near Conway.—Having taken one of the above insect on the last day of July, 1856, near Conway, I have visited the locality every year since—last year three times, and three times this year—and found one sitting on the wall on Bangor New Road, about half-way between Conway and the large rock that projects out into the Irish Sea, opposite Puffin Island. My old friend Mr. Gregson was with me when I found it; this was on the 8th of August, 1860.—*Thomas Hague; "Dog and Partridge," Staleybridge, September* 24, 1860.—'*Intelligencer.*'

Description of the Larva of Acidalia scutulata.—Long, slender and tapering towards the head. Ground-colour pale drab, yellowish on the anterior and posterior segments. Central dorsal line very distinct, dark brown, ceasing on the post-capital segment; on either side of the latter the rudiments of a dusky subdorsal line. Back and sides marbled with indistinct slanting lines and dusky spots. Spiracular line whitish; subspiracular line dusky, waved. Belly dusky, with numerous dark wavy lines and a horizontal chain of dusky oval spots. Body sparingly strewed with short hairs. Taken in October, on flowers of Pimpinella Saxifraga; hybernated and fed-up in April, on flowers of Anthriscus sylvestris.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Herts, October* 17, 1860.

Occurrence of Eupithecia helveticata in Buckinghamshire.—About a month since Mr. Wilson kindly sent me a few larvæ of E. helveticata from Scotland. As their food-plant, Juniperus communis, grows wild upon some of our chalk-hills, I thought there was no just cause or impediment why the larva should not occur here as well as on the other side of the Tweed; so I donned my stick and umbrella, and went out for an hour's thrashing. I am happy to say that my labours were crowned with success. I brought home five larvæ. I have been out several times since, and have each time taken a few more. I have little doubt that wherever the juniper grows wild this insect occurs.—*Id.*

Description of the Larva of Eupithecia abbreviata.—Slender, hairy, tapering towards the head. Ground-colour pale yellowish red. Central dorsal line pale olive. Down the centre of the back a series of pale olive V-shaped spots, sometimes bordered with yellow. Spiracular line yellowish. Segmental divisions red. Central ventral line yellowish, sometimes altogether wanting. Dorsal spots frequently merged in a broad central line. The whole of the markings on this larva vary much in intensity of colouring, but are usually faint and indistinct. Feeds on oak. Full-fed the beginning of July. Pupa enclosed in a slight earthen cocoon; bright red; thorax and wing-cases paler than abdomen; base of wing-cases dusky; abdominal divisions and tip deep red. Perfect insect appears the end of April and in May.—*Id.*

Note on the Pupation of Eupithecia tenuiata.—The larva of this insect, when full fed, comes out of the sallow catkins, and spins a slight cocoon among earth, roots of

grass or moss. The pupa is pale golden yellow. Abdominal divisions dusky. Thorax and wing-cases having a slight greenish tinge. Eyes prominent, blackish. Abdomen short and curtailed.—*H. Harpur Crewe.*

Description of the Larva of Cidaria pyraliata.—Long, slender and tapering towards the head. Ground-colour grass-green. Central dorsal line broad, dark green, bordered on either side by a pale yellow line. Segmental divisions yellow. Central ventral line yellow. These larvæ were hatched in March, from dark yellow eggs laid the previous August. They fed till the last month on Galium Mollugo, afterwards on G. aparine. Full-fed the second week in May. The pupa, which was enclosed in a slight cocoon among leaves, was pale drab, resembling in colour the pupa of Ennomos angularia or E. erosaria.—*Id.*

Description of the Larva of Melanippe hastata.—Head of moderate size: body, when at rest, almost straight; the head not tucked in, and hence the anterior part of the body not involute; 2nd segment covered with a shining plate; the other segments regularly transversely wrinkled, and of a texture like leather; the 10th segment is rather the largest, and from that the larva tapers slightly to both extremities. Head black and shining: body generally black, but sometimes rich black-brown: on each side is a continuous series of minute white dots, which form a slender lateral stripe along all the segments except the 2nd and 13th; this stripe is above the spiracles: the spiracles are black, and each is enclosed in a white spot, and below each white spot is a crescentic white marking, the convexity of which is towards the belly, the cusps towards the back; above the slender lateral stripe already described there is sometimes an interrupted subdorsal stripe: all these markings vary occasionally from white to brick-dust red. Feeds on Betula alba (birch) and Myrica Gale (sweet gale). The economy, habit, structure and distribution of colour in the larva of Melanippe hastata are entirely different from those of any other of the genus; it spins together the leaves of its food-plant, and feeds from the inside of the chamber thus formed, sometimes eating through the substance of the leaf, at others eating only the upper surface; it is full feed on the 27th of August, and soon afterwards becomes a pupa, in which state it passes the winter. I am indebted to the Rev. J. Hellins for the free use of his valuable notes in describing the larvæ of the genus Melanippe, and also of a series of most exquisite coloured drawings of each species by Mr. Buckler.—*E. Newman.*

Description of the Larva of Melanippe tristata.—Cylindrical, slightly attenuated in front, rests in nearly a straight posture, but when disturbed tucks in its head, and the anterior part of the body is then slightly involute. Head brown, dotted with black: body brown, with a dark, nearly black, narrow median stripe; on each side of this are two white dots on each segment; and on each side of the body are two narrow, pale, slightly undulating, stripes, the lower of which is immediately above the spiracles; these two stripes are most delicately margined with black. This larva is extremely constant in colour. Feeds on Galium Mollugo (the great hedge bedstraw), and is full fed on the 1st of August: it spins a slight cocoon on the surface of the earth, and remains in the pupa state throughout the winter.—*Id.*

Description of the Larva of Melanippe procellata.—Cylindrical and elongate; rests in nearly a straight posture, which it retains when disturbed. Head rather small, brown, dotted with black, and having two divaricating darker stripes, nearest together on the crown and most distant at the mouth: body wainscot-brown, lighter from the 10th to the 13th segments, both inclusive; there is a median varied stripe on the back, commencing indistinctly on the 3rd segment, and dilating into a conspicuous dark

blotch at the commencement of the 6th, 7th, 8th and 9th segments; before and after each of these blotches the median stripe assumes a reddish hue, and again assumes a deep black immediately after the red; on each side of this varied median stripe is a paler stripe, also very slender, and beyond these are three smoke-coloured stripes, rather diffuse and ill-defined; the first of these on each side passes into the head, and terminates on each side the mouth, as already described: on the back of each segment are two or four black dots: the 6th, 7th, 8th and 9th segments are slightly darker than the rest; the spiracles are black. Feeds on Clematis Vitalba (the traveller's joy), and is full fed on the 16th September; spins a slight web, and remains in the pupa state throughout the winter.—*Edward Newman.*

Description of the Larva of Melanippe unangulata.—Body stout, rather attenuated at both ends, rests with the head tucked in, the anterior part of the body, when disturbed, being curled in, or curved in the manner of the Ionic volute. Head brown, beautifully dotted and marked with black: body smoky brown, delicately mottled and varied; the back may be said to have seven smoke-coloured stripes, alternating with paler stripes: the median stripe is not perceptible on either the 2nd or 13th segment, but is distinct and uninterrupted on the 3rd and 4th segments; on the 5th, 6th, 7th and 8th segments it is suddenly dilated anteriorly, and more gradually posteriorly, and is extremely attenuated and scarcely perceptible on the remaining segments; on each of the interstices between the segments, commencing between the 4th and 5th, is a short transverse reddish band, terminated at each extremity by a longitudinal black spot; the remaining smoke-coloured stripes, three in number on each side of the median stripe, are scarcely susceptible of verbal definition: each segment of the belly after the 4th has a cluster of black dots which are not present in any other British species of the genus, but Mr. Hellins informs me that markings of the same colour and character occur in Cidaria picata. Feeds on Alsine media (chickweed), and is full-fed on the 1st of August; spins its cocoon on or just under the surface of the earth, and remains in the chrysalis state all the winter. In captivity it is sometimes double-brooded, but not in a state of nature. Mr. Hellins observes that the published descriptions of the perfect insect, being drawn from captured or faded specimens, do not mention the lovely purplish red tint which pervades the dark markings of the wings and body while the moth is fresh from the pupa-case, but which cannot be shown in the cabinet, as in a few weeks it seems totally to vanish.—*Id.*

Description of the Larva of Melanippe rivata.—Head of nearly the same diameter as the body, which is uniformly cylindrical: rests generally in a slightly bent posture, but when disturbed tucks in the head, thus giving to the anterior portion of the body the figure of the Ionic volute. Head dusky brown, with two darker brown lines meeting on the crown: colour of the body red-brown or dingy brown, beautifully variegated and mottled; the 2nd and 3rd segments have a median black line, and on each side of this is a direct white line, which extends into the 4th segment; on each of four succeeding segments is a somewhat horse-shoe-shaped median white mark; these marks might be called lozenge-shaped, but they are open at the posterior extremity; on the 10th segment, and extending thence to the extreme tip of the 13th, is a broad median dark brown stripe, and, separated from this by a space equal to its own diameter, is a white stripe of corresponding length, terminated at its anterior extremity by a somewhat comma-shaped jet-black mark, which has a white dot in the head of the comma; on each side of the median markings is a series of white dots; the 3rd and 4th segments have two dots each, the 5th, 6th, 7th and 8th have four

each; the 9th and following ones have two each; there are several indistinct stripes and dots on each side of the body. Feeds on Galium Mollugo (the great hedge bedstraw), and is full fed on the 22nd July, when it spins a cocoon on the surface of the earth. This species sometimes becomes double-brooded in captivity, but not in a state of nature.—*Edward Newman.*

Description of the Larva of Melanippe subtristata. — Head of nearly the same diameter as the body, which is uniformly cylindrical; rests generally in a nearly straight posture, but when disturbed tucks in its head very tightly, thus giving to the anterior portion of the body the figure of the Ionic volute. Head pellucid, smoky brown dotted with black, and having two darker brown lines which meet on the crown: body brown, beautifully variegated and mottled; the 2nd, 3rd and 4th segments have a median black line, and on each of the six succeeding segments is a somewhat horse-shoe-shaped median white mark, the last of which terminates in a median brown stripe, which extends through the 11th and 12th segments, and to the extreme tip of the 13th; these marks might be called lozenge-shaped, but they are open at the posterior extremity; the enclosed space in each is brick-red, with a median transverse black bar; there are two or four white dots on the back of each segment, and numerous waved markings of different shapes on the sides. Feeds on Galium Mollugo (the great hedge bedstraw), and is full-fed on the 30th June, when it spins a slight cocoon on the earth, and changes to a pupa. This species is double-brooded both in a state of nature and in captivity. The question whether the two species of Melanippe, rivata and subtristata, are identical or distinct, is one which has often occupied the attention of our most acute lepidopterists; I confess myself unable to appreciate the reasons that have been assigned for considering them identical, and have therefore always kept them separate: this opinion, however, has been formed almost entirely on superficial grounds, and without that minute attention to distinctive characters on which alone such a conclusion should be grounded. It is therefore with extreme pleasure that I now cite from the memoranda of Mr. Hellins the following excellent observations:—

"Between the larvæ of Melanippe rivata and M. subtristata there is at first sight as great a similarity as exists between the same insects in the perfect state: the ground-colour of both is the same, varying from a pale fawn-colour through a greenish brown to a dull green, and even sometimes to a bright green, the lines and borders of the markings being of a deeper tint of the ground-colour, and often tinged with a good deal of red; in both, the segmental divisions are light red, though this indeed may be observed in a very great number of gray and brown larvæ, and in both the dorsal markings are of the same shape, namely, dark longitudinal lines bordered with light on the front and hind segments, and on the intermediate ones blunt white arrow-heads,* pointing forwards and placed at the segmental divisions, the white being clearest and brightest at the point, enclosing a diamond-shaped spot of a dark tint of the ground-colour, which at its hinder end runs indistinctly into the broken dorsal line, and themselves enclosed, on the front edge, by a dark suffused V-shaped mark, the apex of which runs into the dorsal line, and the sides appear to reach down to the spiracles, but become indistinct when examined with a lens. So far these species are alike, but a careful examination of a number of specimens during the past two or three

* Perhaps lozenges would be a better word, but the other was chosen on account of the opening of the hinder end, which seems to admit the shaft of the arrow.—*J. H.*

years has led to the conclusion that they differ as follows:—The larva of M. rivata, as might be expected from the relative size of the two perfect insects, is invariably the larger; it is also more delicately tinted, and has the lines better defined; its dorsal arrow-heads moreover are but four in number, being placed on the divisions between segments 5 and 9; the seeming arrow-head between segments 4 and 5 on examination with a lens shows no white, and barely an interruption of the dorsal line; and the dorsal line which recommences between segments 9 and 10 is not preceded by any clear white: in M. subtristata the whole back is generally more clouded, the subdorsal lines which form the boundaries of the white arrow-heads not being defined; the arrow-head mark between segments 4 and 5, in M. subtristata, when examined with a lens, becomes quite distinct, and though not so perfectly formed as the four others that follow it, is yet quite plain and complete; between segments 9 and 10 also there is a well-defined half arrow-head, the hinder part of which runs into the lines on the hind segments, the entire number of arrow-heads being thus five and a half instead of only four. The difficulty of obtaining both species in the same stage, at the same time, no doubt renders this comparison less perfect than it might be could they be placed side by side; but the first or June brood of larvæ of M. subtristata are all gone down before the single brood of M. rivata have assumed the characteristic markings; and these again are gone down before the August and September larvæ of M. subtristata are available for comparison. It is well to mention that among some hundreds of the perfect insects of both species, which have been bred by four or five different entomologists during the last three years, there have occurred no intermediate varieties whatever: M. rivata varies indeed in having the gray border of the hind margin of its wings sometimes tinged with blue, sometimes with brown, but the white lines always preserve their distinctive width, and the under side is always lighter than in M. subtristata: of M. subtristata the only variety that has been observed was one which, far from having the white lines broader than usual, had the dark bands wider: of course worn specimens, which, having lost many of their scales, approach M. rivata in paleness, are not worthy of notice."—*Edward Newman.*

Description of the Larva of Melanippe montanata.— Nearly uniformly cylindrical; rests in a nearly straight position, but tucks the head in very tightly when disturbed, the anterior part of the body then assuming the form of the Ionic volute. Head pale brown, with numerous black lines: body pale brown, with a number of variously coloured markings; there is a narrow median stripe transversing all the segments except the 1st and 13th; the median stripe is particoloured; it is blood-red at the interstices between each two segments beginning from the 4th, and the blood-red portion is always succeeded by a jet-black portion, and the other parts are smoke-coloured; the sides have two approximate, rich brown, rivulet stripes, both edges of which are delicately margined with black; these stripes extend from the head to the 13th segment; below these is a paler stripe, and the belly is also pale, but of a different hue; between the median stripe and the two approximate lateral stripes is a pale brown broader stripe, interrupted with various black markings: on the back of the 7th, 8th and 9th segments is a conspicuous black V-shaped mark, the apex of the V pointing towards the tail, and each terminating in one of the blood-red marks already described; these three Vs are very large, obscuring, on the three segments where they occur, the stripes previously described, and below them are five black dots on each side of the median stripe. The egg is laid in the autumn, on the leaves of Primula vulgaris (primrose), on which this larva hybernates, and is full fed at the end of March: this is

the only species of the genus that hybernates. Mr. Hellins remarks that this larva is always to be distinguished by its having but three perfect dorsal markings instead of four, which is the normal number.—*Edward Newman.*

Description of the Larva of Melanippe galiata. — Almost uniformly cylindrical; generally rests in a slightly curved position, but when disturbed or irritated, tucks the head in very tight, so that it touches the 10th segment, giving the anterior part of the body the form of the Ionic volute. Head pale brown, with two broadish dark stripes united on the crown but widely separated at the mouth; the rest of the head is dotted with black: body brown, with parallel stripes of different shades extending its entire length; the median stripe is almost black, and on each side of it is a paler stripe; in each of these paler submedian stripes are four black spots, one each on the anterior edge of the 6th, 7th, 8th and 9th segments; again, outside each of these submedian stripes is a very pale stripe, almost white; then follows a broader, more diffuse and more irregular double brown stripe, perhaps more precisely described as two, brown and closely approximate, rivulet stripes, a very delicate pale stripe passing between them; then follows a paler stripe, in which are situated the spiracles; and, finally, the belly is paler, but striped much in the same way as the back. Feeds on Galium verum and G. Mollugo (two species of bedstraw), and is double-brooded; the second brood of larvæ are full fed on the 5th of September. I am indebted to Mr. Smithson for the larva of this species. Mr. Buckler has represented an extremely beautiful variety, in which the black dots on the back form the nuclei of variegated black, red and white markings.—*Id.*

Description of the Larva of Melanippe fluctuata.— Slightly attenuated towards each extremity; generally rests in a slightly bent posture. Very variable in colour, brown, gray or green: I describe the brown type: head delicately marked transversely with dark brown; median stripe interrupted and of various colours, of which brick-red and deep black are the most conspicuous; a small oblong red space surrounded by dingy white occupies the middle of the posterior margin of each segment after the 4th, and is united to a black spot similarly surrounded on the anterior margin of the succeeding segment; the two combined constitute what Mr. Hellins terms the arrow-head markings; the dorsal surface of the 10th, 11th, 12th and 13th segments is very pale, forming a conspicuous pale patch, and this is continued beyond the posterior margin of the 9th segment; each of the segments after the 4th has four distant and distinct white dots, arranged in a square; those on the 10th, 11th and 12th segments are surrounded with small black markings; the sides are pale; the belly is also pale, but has darker stripes. Feeds on the several varieties of cultivated Brassica (cabbage), on Tropæolum majus (nasturtium) and other garden plants, and is double-brooded, both in a state of nature and in captivity; the second brood of larvæ is full fed on the 5th September.—*Id.*

Description of the Larva of Platypteryx falcula.— Does not roll in a ring or feign death when disturbed; general figure somewhat onisciform, but pointed at the tail; anal claspers represented by two points not used in walking; there are two prominent and distant papillæ or nipple-shaped warts on the back of the 3rd, 4th, 5th and 6th segments; those on the 5th segment smaller and shorter than the others; those on the 3rd and 4th segments are sesquialterous, that is they have a smaller papilla adjoining them on the outer side; the papillæ are crowned with a circle of short brown hairs, and a larger bristle rises from the centre of each circle; the 7th, 8th, 9th, 10th and 11th segments have each two minute warts in the place of papillæ; each of these also

emits a bristle: head with the face gray, the crown gray-green, with two transverse reddish bars: body pale green, with testaceous or purplish markings on the mottled back of the 6th and following segments; these markings combine in forming a broad stripe down the middle of the back, the papillæ being of the same colour as and included in the stripe. Feeds on Betula alba (birch); doubles over the corner of the birch leaf, and spins a slight web, in which it changes to a pupa; is double-brooded; the second brood of larvæ is full-fed on the 28th September. For examples of this and the cuspidate larvæ which follow I am indebted to Mr. Thomas Huckett, whose zeal and industry as a collector of Lepidoptera, and as a student of their habits, has rarely been equalled. — *Edward Newman.*

Description of the Larva of Dicranura vinula.—Rests with its flat head drawn into the 2nd segment, and its anterior segments elevated; the body is quite smooth, the dorsal outline rising to a pointed hump on the 4th segment, then falling to the 6th segment, then of uniform substance to the 9th, and thence the body is rapidly attenuated to the 13th, the claspers belonging to which are converted into two horns covered with scabrous points, and each emitting, when the larva is irritated, a slender, pink, drooping filament; head pale brown in front, black at the sides; the recess into which the head is withdrawn is pink, with a large black spot on each side: body with a white lateral stripe ascending obliquely from each side of the head to the apex of the hump, then descending obliquely to below the spiracle on the 8th segment, then again ascending elliptically and terminating at the base of the horn-like claspers; above this white stripe the body is whitish, longitudinally striated with purple-brown, the white predominating along the median line, the purple-brown predominating in the vicinity of the lateral white stripe; below this white stripe the body is yellow-green, with the exception of a purple-brown blotch, nearly round, just above the clasper on the 8th segment: this blotch is bordered above with white; the legs are yellow-green, with a black ring at the base and black tips; the eight normal claspers are green, the two horn-like anal ones whitish with black scabrosities. Feeds on several varieties of narrow-leaved Salix (willow); is full fed in July; crawls down the stem of the willow to within two, three or four feet of the ground, then gnaws out the bark and spins an extremely tough gluey cocoon in the excavation thus made; in this gluey cocoon it changes to a pupa, and remains in that state all the winter.—*Id.*

Description of the Larva of Stauropus Fagi.—Does not roll in a ring or feign death when disturbed; when at rest throws back its head so as entirely to hide the 2nd, 3rd and 4th segments; the head being quite equal in bulk to these three segments if united; the posterior segments are at the same time elevated in an extraordinary manner; 1st pair of legs of moderate size, 2nd and 3rd pairs with the femora and tibiæ extremely lengthened; body deeply incised; 5th, 6th, 7th, 8th, 9th and 10th segments each with two humps; those on the 5th, 6th and 7th largest and of equal size, the others gradually decreasing in magnitude; 11th, 12th and 13th segments without humps; 11th segment with a small, flattened, dilated, crenulated, lateral margin; 12th with a much more extensive margin, having the same characters; 13th segment having the two anal claspers converted into stiff, slightly clavate, slightly curved appendages or tails. The colour is testaceous-brown, covered throughout with pale points like shagreen; there are two interrupted, slender, black stripes down the back, and a paler median stripe between them; there are moreover several slender black markings on both sides of the larva. This singular larva, which is known to collectors

as "the lobster," feeds on oak, and is full fed on the 25th September; it then spins together two or three oak leaves, and makes a retreat wherein to form its cocoon; in this it changes to a pupa, and when the united leaves fall on the approach of winter, they form a kind of parachute, which conveys the pupa gently and safely to the ground, where it remains throughout the winter.—*Edward Newman.*

Description of the Larva of Clostera reclusa. — When at rest maintains a straight posture, the ventral surface being closely appressed to the leaf or twig of the food-plant. Head black: body with a very broad median gray stripe down the back, in which stripe is a central, tubercular, velvety spot on the 5th, and another on the 12th segment; this stripe also contains yellow transverse markings, which are very distinct on the 3rd, 4th and 6th segments: on each side of the gray median stripe is a broad, lateral, smoke-coloured stripe; the belly, legs and claspers are also smoke-coloured, and between the smoke-colour of the lateral stripe and that of the belly is a narrower stripe, composed of black and yellow spots and dots, and including the spiracles: the entire body of the larva is slightly hairy. Feeds on Salix capræa (sallow), and Populus tremula (aspen), and is double-brooded; the first brood is full fed on the 5th July, the second on the 28th September; then spinning a web amongst the leaves of its food-plant, and turning to a pupa in the retreat thus fabricated, it remains in that state throughout the winter.—*Id.*

Description of the Larva of Ptilodontis palpina. — Does not roll itself in a ring or feign death when handled. Head rather small: body without hairs or humps, but rough with transverse wrinkles. Colour of both head and body glaucous green, with six stripes; two of these are slender, white, tolerably near together, running parallel down the back; each of them is composed of minute, raised, white warts; on each side of these is a lateral stripe of the same hue, but more slender, less conspicuous and less evidently composed of warts; and below this on each side, just above the spiracles, is a most distinct yellow stripe, delicately margined above with intense black; on the 2nd and 3rd segments is a little patch of delicate lilac immediately adjoining the yellow stripe; the two middle dorsal stripes and the yellow spiracular stripes, together with their black margin, extend along the head to the very mouth; but the middle stripe on each side does not enter the head. Feeds on several varieties of broad and narrow-leaved Salix (willow and sallow), and on more than one species of Populus (poplar); is full fed on the 2nd of October; spins on the surface of the ground, and remains in the pupa state all the winter.—*Id.*

Description of the Larva of Notodonta camelina.—Does not roll in a ring or feign death when handled; when at rest it raises both ends. Head of moderate size, greenish; body uniformly cylindrical to the 12th segment, which is rather tumid, and has two distinct but approximate warts on its back. The colour is glaucous green, paler on the back; the warts are tipped with pink and armed at the tip with a small fascicle of short black bristles; a slender bluish median stripe originates on the back of the 3rd segment, and passes in a direct line to between the pink-tipped warts on the 12th segment; the back is particularly inclined to white on each side of this median stripe; on each side of the body is a series of white spots, most of which enclose a black spiracle, and behind each white spot, and closely adjoining it, is a pink spot; this series of spots is connected together by a number of slender white lines, and the whole together constitute what might with propriety be called a spiracular stripe. All parts of the body emit scattered black bristles, the head and second segment have more than the following segments; the legs and claspers are pinkish; the belly is distinctly

green. Feeds on Betula alba (birch), Acer campestris (maple), Quercus Robur (oak), &c., is full fed on the 20th of September; it spins a slight cocoon on the surface of the earth, and remains in the pupa state all the winter.—*Edward Newman.*

Description of the Larva of Notodonta dictæa.—Does not roll in a ring or feign death when disturbed, rests in nearly a straight posture, as when crawling. Head rather large, very slightly notched on the crown, shining, pale green; body almost uniformly cylindrical until the 12th segment, which is humped, the hump terminating in a moderately sharp point; body whitish or glaucous-green on the back, a broad paler green stripe on each side, and adjoining it a narrow raised yellow-green stripe just below the spiracles, and touching all of them except that on the 12th segment, it extends the entire length of the insect, terminating in the anal clasper; on the summit of the 12th or humped segment is a black transverse line. Feeds on Populus nigra (black poplar), Salix capræa (sallow), Betula alba (birch), &c.; is full fed on the 22nd of September: spins a slight web on the surface of the earth, attaching the upper part of the web to a fallen leaf; it remains in the pupa state throughout the winter. There is a very common variety of this larva, plain brown without the slightest appearance of the lateral stripe: this after the last change of skin.—*Id.*

Description of the Larva of Notodonta dictæoides.—Does not roll in a ring or feign death when disturbed; rests in nearly a straight posture, as when crawling. Head rather large, being slightly notched on the crown, brown, shining. Body almost uniformly cylindrical until the 12th segment, which is humped, the hump terminating in a somewhat sharp and very shining papilla; the 13th segment is rugose above; back purple-brown, very shining when full fed; on each side is a distinct yellow stripe, which includes the spiracles, excepting that on the 12th segment; the spiracles are black; the belly is much paler than the back. This larva, when compared with that of Notodonta dictæa, may be distinguished by its somewhat more slender proportions, by its more glabrous skin, by its uniformly possessing the purple-brown hue, and by the greater brightness and distinctness of the lateral stripe. Feeds on Betula alba (birch), and is full fed on the 27th of September, when it descends to the ground, spinning a slight cocoon between the surface of the earth and a fallen leaf: it remains in the pupa state all the winter.—*Id.*

Description of the Larva of Notodonta Dromedarius.—Does not roll up in a ring or feign death when disturbed; rests with both extremities elevated, and its anal claspers, which are rather long, porrected, but these can be used in walking when required. Head manifestly larger than the 2nd segment, bifid at the crown, the lobes blunt and rounded; shining brown, speckled with darker brown, the sides rather paler: body not regularly cylindrical, but uneven, humped on the 5th, 6th, 7th, 8th and 12th segments; the hump on the 8th segment is the least, those on the 5th, 6th, 7th and 8th have obtuse summits directed backwards; that on the 12th segment is erect. Colour of the body yellow-green, with purplish brown markings, which form a conspicuous stripe on the back of the 2nd, 3rd and 4th segments, and which crown all the five humps and fill the interstices between the 2nd and 3rd, and 3rd and 4th; on the fifth hump this purple-brown colour forms a mere line, and there is a similar line on the last or 13th segment: a very similar colour occupies nearly the whole of the belly, which is darkest on the 10th, 11th and 12th segments. It feeds on Betula alba (birch), and is full fed on the 29th of September, when it descends the tree and generally spins a slight cocoon on the earth, attaching the upper side of the cocoon to a fallen leaf: in this situation it remains in the pupa state all the winter.—*Id.*

Description of the Larva of Notodonta Ziczac.—Does not roll in a ring or feign death when disturbed; rests with both ends of the body elevated. Head large; body with one hump each on the 6th, 7th and 12th segments, that on the 6th largest and pointing backwards. Head brown: body purple-brown, with darker patches on the back of the 2nd, 3rd and 4th segments, also on the front of the dorsal humps: these darker patches are bordered with paler margins, there are also paler oblique lines on the sides of the segments; 11th and 12th segments yellowish, dorsally marbled with brown; there are two pale approximate lines on the back of the 8th, 9th and 10th segments. Feeds on several species of Populus (poplar and aspen) and Salix (sallow and willow), and is full fed at the end of September, when it spins its slight cocoon on the surface of the earth, and remains in the pupa state all the winter.—*E. Newman.*

Description of the Larva of Notodonta dodonæa.—Does not roll in a ring or feign death when disturbed; rests in nearly a straight posture, the anal claspers being sometimes, but not always, raised, and I have never observed the head thrown back. Head larger than the 2nd, 3rd and 4th segments, bluish green, reticulated; body pale green, transversely wrinkled; two yellowish and very narrow stripes near together down the middle of the back; these are composed of yellow dots: two similarly dotted stripes are observable outside these, but not extending beyond the 6th segment; on each side of the larva, extending from the head to the anal point, is a raised pale stripe, which is alternately pink and pale yellow, and which includes the spiracles. Feeds on Quercus Robur (oak), and is full fed on the 4th of September, when it spins a slight cocoon on the surface of the ground, and changes to a pupa, in which state it remains throughout the winter.—*Id.*

Description of the Larva of Xylophasia lithoxylea.—The larva of Xylophasia lithoxylea being marked unknown, I beg to say I have bred the insect this summer from a larva found at the roots of grass: it was of large size; colour dirty white, with a bluish tinge below; head and tail black, with two rows of black shining spots on each segment, one hair in each spot. I found it on the 8th of May; it seemed then nearly full fed: the perfect insect appeared on the 8th of July.—*John E. Robson; Queen Street, Hartlepool.*—'*Intelligencer.*'

Description of the Larva and Pupa of Achroia grisella.—I met with this species about three weeks ago in the apiary of a neighbour. A description of the insect in its larval and pupa states may not be uninteresting. Larva about nine lines in length when full fed; very active, throwing itself into violent contortions at the slightest annoyance; white with a tinge of pink; rather hairy; the head and second segment reddish brown; spiracles barely perceptible. Pupa pale brown, enclosed in a white cocoon; usually secreted under the inside ligaments near the entrance of the hive. Does Achroia grisella hybernate? I found my specimens in what were said to be hives of the present year, and the perfect insects are now making their appearance.—*Thomas Fyles; Scotter, Kirton-in-Lindsey, October* 3, 1860.—*Id.*

Note on the Habits, &c., of Diasemia literalis as observed near Plymouth. — This species has occurred near Plymouth this year, at two very distinct periods, *viz.* in June and September, which makes it appear as though the species were double-brooded; but not having visited the place where it appeared in the intermediate months, I have no further proof of its double-broodedness than seeing and capturing it at the times mentioned. I took about two dozen specimens. "In July," says Mr. Stainton, "Diasemia literalis makes its appearance: this insect has generally occurred only singly, and in *dry* places, though the idea had long been prevalent that, like the Hy-

drocampæ, it was attached to ponds." The idea of its being attached to ponds is certainly wrong, at least in the imago state; and I think it can hardly be so in any stage, seeing there is no water in the neighbourhood of its habitat. This insect in habits rather resembles the Pyraustæ, flitting about in short flights during sunshine, and not easily approached in shade. The locality for it is a high, sloping down, where the furze and fern are the principal occupants of vegetable growth, but there are also the usual plants that cover a Devonshire down, heath or moor; some fine clumps of Ericæ are there, and "I know a bank a whereon the wild thyme blows." I can safely advise those who may wish to take the species to look for it in a *dry* place. — *J. J. Reading; Plymouth.*

Vespidæ in 1860. By S. Stone, Esq., Hon. Member Ashmolean Society.

It may with truth be remarked that we have passed through an entire year of which neither spring nor summer has formed any portion, the weather having been altogether of a wintry character during the whole of the past twelve months. Had we been deprived of the blessing of sight we should have been completely in the dark as to how the year was progressing: we have only been able to ascertain it by observing that somehow or other the fields became clothed with verdure, that the foliage was renewed on hedgerows and trees, that the grass grew till it arrived at maturity, in spite of the night frosts which made repeated and desperate attempts to cut it down and thus anticipate the mower, that some of it by some means got made into hay, that the corn—a portion of it—became ripe and was gathered in, that the days grew longer, till the maximum length had been attained, and that they then as usual began to shorten. Had we depended solely on the temperature for information we should have been sorely perplexed, in fact we should have been wholly unable to decide whether we were living in the month of July or January, whether the sun was about to enter Aries, or whether it had got into Libra.

Female wasps, which ordinarily make their appearance early in April, and not unfrequently in March, were not observed upon the wing till late in May, when a few showed themselves for a day or two, and were apparently in search of eligible building sites, the weather just then being bright and sunny, but with severe frosts at night. I at once set about forming a number of suitable cavities in the locality they frequented, hoping thereby to obtain, as I had done the year before, a variety of nests, but the drenching rains which fell immediately after I had completed them, and which continued almost without intermission for weeks, cut off the expectations I had formed; not a single

chamber became tenanted, nor were the insects again to be seen near the spot, which was in the immediate vicinity of the place in which hundreds of young females had the previous autumn been reared.

Early in July I was rather astonished at seeing a young working wasp busily employed in gathering materials for building. This was at Cokethorpe Park, a favourite locality for various species of Vespidæ. From this circumstance I knew that one female had succeeded in founding a colony. It was not long before I met with other workers, at distances so far apart as to make it apparent there must be more than one or two nests in the neighbourhood. All doubt upon the point was removed on obtaining specimens, which proved to be of four different species, *viz.*: Vespa germanica, V. vulgaris, V. rufa and V. sylvestris. It was not until the end of the month that I succeeded in discovering a nest which turned out to be one of V. germanica. I did not immediately take possession of this nest but made diligent search for one of V. vulgaris, my object being to obtain, if possible, one containing larvæ of Ripiphorus, a parasite I have never yet found, except in nests of that species. In my search I met with one of V. rufa, which I immediately dug out, taking it away, but purposely leaving a number of the workers behind, carefully replacing the sods I had removed over the cavity and making an entrance thereto from without. In the course of a few days I found, as I expected would be the case, that a fresh nest had been begun by the workers I had left behind, and that the work was being briskly proceeded with.

About the same time a nest, or rather the situation of one, was pointed out to me by the gardener at Cokethorpe Park. It was in a wall in the kitchen garden some ten or twelve feet from the ground. The stones forming the inner portion of the wall were lying hollow, so as to allow of the construction of a nest of small size, such as is that of V. sylvestris, of which species this was. Probably the weather influenced the parent wasp in her choice of a situation and caused her to fix on this novel one. With reference to this species I may remark that, with the exception of the one mentioned above, all the nests I have met with have been constructed under ground. Mr. Smith, however, considers it to be rather a tree-building species than an underground one. In lightness of appearance and elegance of shape the nests of this species far surpass those of any other of the British Vespidæ.

A specimen of V. Crabro was next observed. This insect I succeeded in tracing to the nest, which was situated in the head of a pollard ash that had been cut down and was lying in the wood-yard

at Cokethorpe. There did not appear to be more than about twenty workers developed at that date.

I next discovered a second nest of V. rufa, which I dug out, and, as before, left a number of the workers behind: these, as in the former case, immediately set about the construction of a fresh nest.

I now succeeded in finding one of V. vulgaris, which I duly took possession of. On digging it out I found that the original nest, after having attained a considerable size, had succumbed to the incessant rains which fell, and had fallen, with the exception of the upper comb, to the bottom of the cavity in which it had been built, where it was lying, a mass of decomposed and offensive matter. The parent wasp would appear either to have perished with it or to have abandoned the spot when the catastrophe occurred, as at the time I dug into it, she was nowhere to be found, and, moreover, there was unmistakeable evidence that she had had no hand in the work, or in directing the work, of the nest which had arisen over the ruins of the original one. On removing the covering the interior presented an appearance so unlike the interior of one over which a queen presides that I at once felt convinced no queen had ever set foot in it. No order or regularity was observed in the disposition of the combs; small ones, to the number of seven, were to be seen stuck about here and there upon the face of the original one, from which they depended, while the cells were crowded with eggs or small larvæ, one cell containing as many as sixteen eggs, and but few less than five or six. The colony—for having chloroformed I secured the whole lot—consisted exclusively of workers, and they rather under than over the average size. On reaching home I placed the nest, with the insects belonging to it, near the window of an empty room, where the larvæ were fed, and fresh eggs continued to be deposited by these workers, but no attempt was made to renew the covering or to construct fresh cells.

I now took out one of the nests of V. rufa that had been formed by the workers after the removal of the original one, and in a few days afterwards the other. Each contained a single comb, that in the former being about an inch and a half in diameter, and the latter about an inch. The cells in each contained a profusion of eggs as well as larvæ of various sizes. In many of the cells the larvæ had become full fed and had spun themselves up, in which case, as well as where they had attained to anything like their full size, they occupied each a separate cell, while each of the remaining cells contained either a group of eggs or a number of larvæ. Both these colonies consisted of workers of the ordinary size, the whole of

which I secured, and in both instances fresh eggs continued to be deposited by them after the nests had come into my possession and had been placed in a favourable situation for work.

In order to ascertain what proportion of the workers in each of these three nests—the two of V. rufa and the one of V. vulgaris—possessed the power of producing eggs, I chloroformed the whole number so effectually as to cause them to

"Sleep the sleep that knows no waking,"

and then made a *post-mortem* examination of the bodies, the result of which was that in each case one in every five or six was found to contain a mass of eggs, some ready for extrusion, others in a less advanced state. I have a number of these eggs preserved in spirits, and have also preserved the insects from whose bodies they were extracted. These I will place in the hands of Mr. F. Smith, of the British Museum, who, I doubt not, will kindly take charge of them, and allow any Hymenopterist to examine them who may wish to do so, in order that they may satisfy themselves that the specimens are those of common working wasps and nothing more.

I now made an attempt upon the nest of V. germanica, but owing to the hollowness of the ground the attempt was an unsuccessful one. I therefore put in an extra dose and left it until the following evening, when I found the whole of the insects dead. I took the nest home, but did not remove the covering for several days: when I did so I found the cells crowded with eggs or larvæ, just as I had previously observed to be the case in the nest of V. vulgaris: there was, however, nothing unusual in the shape or disposition of the combs, nothing in the appearance of the nest beyond the circumstance I have just mentioned, to indicate that it was not one governed by a queen. The lower comb consisted of cells of large size, evidently intended for the reception of female-producing eggs. No queen was found in the nest, but I am unable to say whether she might or might not have fallen out of it on its removal. I could obtain no satisfactory results from an examination of the bodies of the workers in consequence of the decomposed state in which they had become.

On the 7th of September I stormed and took the nest I had previously discovered of V. Crabro, securing the whole colony, which consisted of about a hundred individuals, alive. The means employed in the capture of these insects, and with them a specimen of Velleius dilatatus have already been made known to entomologists, a detailed account having been published in the 'Intelligencer.' The nest with its inmates

was placed in a glazed box and removed to a room near where I reside, a distance of about two miles from the place of capture, and there the work of building, &c., was resumed, and has since been steadily carried on. The covering of this nest is not one which completely encloses the combs, like those formed by the other species of social Vespidæ, but merely one that resembles an inverted basin or bowl placed over them, and which reaches to about an inch below the lower one, the necessary additions being made to it on the construction of every fresh comb to bring it to about the point I have stated, beyond which it is not allowed to extend, for if one set of workers should, as sometimes happens, venture to make such additions to it as to bring it beyond that point, another set may be observed busying themselves in the work of demolition.

They work with great steadiness throughout the night by the light of a candle—rushlight rather—with which I supply them, and it struck me as being remarkable that when this artificial light was introduced to them, or they to it, for the first time, it did not cause the least disturbance among them, but that they at once began to work by it just as though it had been the light of day. Another thing remarkable is, that while the nest was in its original situation a number of the workers might be seen going out and coming in, all night, by the light of the moon, or even by that of the stars when the sky was clear, but since its removal to the situation it now occupies, not a single individual has ever ventured out after nightfall, whether the moon has been shining brightly or not. This may perhaps in part, but cannot I think be wholly accounted for, from the fact that they can now procure building material, as well as food, without leaving the box in which they reside, a constant supply of both being kept immediately under and around the nest.

In conclusion I may remark that the nests I have enumerated were obtained within a very limited space. No two were situated half a mile apart, and all except one were found within two or three hundred yards of each other. I know, from repeatedly observing bodies of workers apparently catering for the undeveloped young, that two others, one of V. rufa, and one of V. sylvestris, might have been found in the immediate vicinity, but time did not permit me to make search for them, and I have no doubt that if other parts of the park had been as thoroughly examined as the limited portion to which my attention was directed, many others might have been obtained. That there has been a comparative scarcity of the Vespidæ is unquestionable, still I think, if diligent and persevering search had been made, a sprinkling of nests

over all parts of the country would have been found, since it is unlikely this locality should, in reality, be a more favourable one than others. Here no one beside myself, except in the case of V. sylvestris, has discovered a nest, but all have declared that they "have not seen a a single wasp this year." I should doubtless have been unsuccessful, but that I had resolved upon procuring nests if they were to be found, and both eye and ear, and time and attention, were forthwith wholly engaged in the search. The result goes to prove that, however adverse a season may be, a number of the Vespidæ sufficient to preserve the race, and prevent its extinction, will be sure to be enabled to struggle through it. S. Stone.

October, 1860.

Capture of Haltica Atropæ in Britain.— I beg to send you some specimens of a Haltica new to Britain, the Haltica Crepidodera Atropæ; it was first taken by my friend Mr. John Gray, on the deadly nightshade (*Atropa Belladonna*): Mr. Wollaston and I subsequently joined Mr. Gray in a second visit to the locality, and we took two or three hundred amongst us. Dr. Power had previously taken the same species near Reigate, and had the specimens undetermined in his boxes: I had also taken some specimens some years ago near Northampton. — *Hamlet Clark; October* 8.

Occurrence of Bagöus nodulosus in Hammersmith Marshes. — I beg to send you a notice of the capture of a new British Bagöus. I should have recorded it before, but have been waiting to hear from Mr. Walton. Mr. Waterhouse has kindly gone over the few British species of the genus with (and after) me, and unites with me unhesitatingly as to the correctness of my opinion on the point. On the 19th of August last I captured at Hammersmith marshes a solitary example of this species, which is certainly not included in the national collection, or in any other I have had an opportu- of examining. It is the Bagöus nodulosus of Schönherr, and must be placed between B. binodulus and B. limosus in our lists. At first sight it resembles the first of these two species, but it is rather broader and not so long. The chief points of difference being that in B. nodulosus the thorax, which wants the constricted hinder margin of B. binodulus, has the dorsal furrow scarcely perceptible, whereas in the latter species it is very distinct. The elytra also in B. nodulosus are much more evenly and deeply sulcated, the interstices being elevated and roughly granulated instead of merely punctured, whilst the second from the suture is without any posterior nodule, so that B. binodulus has, on each elytron, four knobs, and B. nodulosus only two. It appears from Schönherr to be an inhabitant of Germany.—*E. C. Rye;* 284, *King's Road, Chelsea, S.W., October* 18, 1860.

Correction of an Error. — I find I have described the species of Hallomenus as "fuscus" ('Intelligencer,' vol. viii. p. 179); this ought to be "humeralis," and is the species described by Mr. Janson in the 'Annual' for 1859, p. 142. In quoting the record of its capture into the 'Zoologist' it is said I took it "near Lee." It was not taken there.—*John Scott;* 13, *Torrington Villas, Lee, S.E., October* 4, 1860.

[Mr. Douglas informs me he took this insect at Charlton.—*E. Newman.*]

Proceedings of Societies.

Entomological Society.

October 1, 1860.—H. T. Stainton, Esq., V.P., in the chair.

The following donations were announced, and thanks ordered to be presented to the donors:—'The Journal of the Royal Agricultural Society of England,' vol. xxi. Part 1; presented by the Society. 'Proceedings of the Royal Society,' vol. x. No. 40; by the Society. 'Mémoires de l'Académie Imperiale des Sciences, Belles-Lettres et Arts de Lyon,' Classe des Sciences, Tomes viii and ix.; Classe des Lettres, Tome vii.; by the Academy. 'Annales des Sciences Physiques et Naturelles d'Agriculture et d'Industrie de Lyon,' Tomes ii. and iii.; by the Society. 'Exotic Butterflies,' Part 36; by W. W. Saunders, Esq. 'The Journal of the Society of Arts' for September; by the Society. 'The Zoologist' for September; by the Editor.

Election of a Member.

M. Deyrolle, of Rue Rivoli, Paris, was balloted for, and elected a member of the Society.

Exhibitions.

Mr. Janson exhibited specimens of Epitrix Atropæ, *Maerkel*, *Foudras* (Crepidodera Atropæ, *Allard*), taken on Atropa Belladonna, near Arundel, by Mr. Wollaston and the Rev. Hamlet Clark, on the 8th ultimo. He remarked that several examples of this species, new to the British list, had been found a few days previously in the same locality by Mr. John Gray, and he had this morning heard from Mr. S. Stevens that specimens, reported at the time as the E. pubescens of Panzer, were taken by Mr. H. Francis near Reigate, on the 22nd of June last. He also remarked that this insect, considered by the older entomologists as a mere variety of E. pubescens, and beautifully figured as such as far back as 1803, by Sturm in the 'Entomologische Hefte,' was first signalised as a distinct species by Herr Maerkel, and that the late M. Foudras of Lyons had described it in his extraordinary work 'Altisides de France,' and pointed out the differences between it and its near allies Epitrix pubescens, *Panz.* and E. intermedia, *Foudras*; and further that the genus Epitrix is not accepted by by M. Allard, in his 'Essai Monographique sur les Galerucites Anisopodes, *Latr.*, ou Description des Altises d'Europe et des bords de la mer Méditerranée,' of which the first portion has recently appeared in the 'Annales de la Société Entomologique de France,' who places the E. pubescens and E. Atropæ at the end of the genus Crepidodera, remarking with respect to the latter that "elle n'est peutêtre q'une variété de la pubescens;" but the form of the ædeagus, described by M. Foudras, is so dissimilar in the two insects, and, setting aside size and colour, the difference in the form and sculpture of the prothorax, although in creatures thus minute scarcely perceptible to the unassisted eye, is so apparent under a lens, that he entertained no doubt whatever as to the propriety of considering them good and distinct species.

Mr. Janson also laid before the meeting a box, handed to him for that purpose by Mr. Baly, containing examples of closely allied species of Donacia, Chrysomela and Paropsis: by the side of each specimen, mounted on card, were placed the generative organs extracted from it. He called particular attention to these organs as exhibiting striking differences in species so closely resembling each other as to be readily taken

for mere varieties, and to the perfect condition of the insects which had been submitted to this operation, showing that with a little practice and care the most valuable insects may be thus treated without injury.

Mr. Stevens exhibited two examples of Diachromus germanus, taken at Hastings a few years ago; and a specimen of Coptodera massiliensis, found alive in the street at Hastings many years since by Mr. Rankings.

Mr. Waterhouse considered this latter insect had most probably been imported amongst foreign plants.

Mr. Stevens also exhibited a small collection of insects of various orders made by Mr. Oxley in New Zealand; and a large box of Coleoptera and Lepidoptera from the vicinity of the Cape of Good Hope, sent home by Mr. Trimen; also fine specimens of Goliathus Derbyanus, from the interior of Africa, likewise forwarded to this country by Mr. Trimen.

Mr. Westwood exhibited a box of exotic Lepidoptera, recently obtained in Paris, containing many rare and interesting species, especially several collected by M. Lorquin in the Philippine Islands, including Papilio Dædalus, Zethera Pimplea (of which the male only had been hitherto known—figured by Erichson—the female now exhibited being totally unlike the male), Debis Lorquinii, a species belonging to the family Satyridæ, but having the wings of the male of a resplendent blue colour; also Morpho Aurora, *Westw.* (a lovely species of great rarity), several brilliant Erycinidæ, a fine new Paphia from Columbia, and a remarkable Adolias from the Philippine Islands; likewise specimens of both sexes of Saturnia Cynthia and S. Ricini, reared at Paris, as well as specimens of both sexes of a hybrid variety reared between the two last mentioned species. Unfortunately, owing to the absence of M. Guérin Méneville from Paris during Mr. Westwood's visit, he had not been able to obtain any detailed account of the circumstances under which these hybrids had been produced, nor had he learned whether they were prolific. M. Guérin himself had given in the 'Annales de la Société Entomologique de France,' 1859 (Proc. p. xlvi.), some account of these hybrids showing their peculiar tendency both in structure and habits to one or other of their parents. On the occasion when this account was given to the French Society, M. Aubé suggested the probability that the two supposed parent species were not specifically distinct, but were, on the contrary, only races due to domesticity, an opinion which Mr. Westwood was induced to adopt, although the circumstances connected with the two supposed species as regarded their food-plants, relative capability of enduring cold, time of pupation, &c., if applied to great numbers of the Micro-Lepidoptera would be regarded by most modern Lepidopterists as decided evidence of distinctness of species. Even supposing these hybrids are not fertile (upon which, however, Mr. Westwood had no information) the fact of the facility with which the species had been crossed seemed to him to show that the pareuts were more nearly related than if they were really distinct species.

Mr. Lubbock wished Mr. Westwood would confirm by actual experiments his repeatedly expressed opinion that very many of the so-called species, both of Macro- and Micro-Lepidoptera, were mere modifications produced by diversity of food, locality, &c.

Mr. Stainton observed that the hybrid Saturniæ exhibited by Mr. Westwood were larger and finer insects than either S. Ricini or S. Cynthia; he thought such would hardly be the case if they were mere local varieties of one species.

Mr. Syme exhibited a female specimen of Sphinx Convolvuli, which had emerged from the pupa on the 15th ult. It had been produced from a larva found in a potato field at Deal in the autumn of last year, and had remained nearly a year in the pupa state; the eggs contained in the abdomen were, however, extremely small.

Mr. Smith exhibited a specimen of a Danish humble-bee (*Bombus equestris*) caught by Mr. J. Stevens on board a steamer at sea, midway between Hamburg and Lowestoft, and consequently about two hundred miles from land.

Mr. Smith also exhibited two parasites found on Anobium paniceum, received from Dr. Power. The insects, which were a species of Pteromalus, had been found by that gentleman on the Anobia, bred in a preparation of a human arm which had been laid aside for some time.

Mr. Janson observed that he had frequently met with Anobium paniceum associated with a minute Hymenopterous parasite closely resembling, he would not say identical with that exhibited by Mr. Smith, in druggists' shops, amongst pearl barley and coriander seed.

Mr. Stainton exhibited, on behalf of the Rev. Mr. Hellins, drawings of the larvæ of the nine British species of the genus Melanippe, admirably executed by Mr. W. Buckler. The larvæ delineated had in all instances been bred from the eggs, and were represented both of the natural size and magnified.

Mr. Bond exhibited some Lepidoptera from the Isle of Wight, including a fine example of Leucania vitellina, and the female of Agrotis cinerea, both captured by Mr. Rogers; and a beautiful series of Heliophobus hispida taken by himself.

Mr. Stevens communicated some extracts from a letter received by him from Mr. R. Trimen, on the Entomology of the Cape of Good Hope.

Mr. Janson said that he was desirous of contradicting a report in circulation relative to Donacia Comari, exhibited by him at the previous meeting as a species hitherto unrecorded as British, to the effect that it is described by the late Mr. Stephens under the name of Donacia Proteus, and had therefore been long known as indigenous. He stated that the facts are simply as follows. *First*, Stephens' Latin diagnosis of D. Proteus is copied *verbatim* from Kunze; his description is an abridged translation from the same author. *Secondly*, D. Proteus of Kunze is identical with D. sericea of Linneus, and has been cited on all hands for the past twenty years as a synonym of that species. *Thirdly*, D. sericea of Linneus and D. Comari of Ahrens and Suffrian (D. sericea, *Ahrens olim nec Linn.*) being a distinct species it is obvious that Stephens' description cannot refer to D. Comari. Moreover the "prominent anterior angles of the thorax" of Stephens' description of D. Proteus apply incontestably to D. sericea of Linneus and not to D. Comari, which has those angles obtuse and deflexed.

Supposed new Species of Nonagria.

Dr. Knaggs exhibited some specimens of an undescribed species of Nonagria? taken at Folkestone, and read the following remarks and description:—

"It may be recollected that specimens of Nonagria concolor were taken for the first time in this country at Whittlesea Mere, in the year 1849, and for the last time, in the same locality, in 1850. The spot was afterwards destroyed by fire, and subsequently cultivated, since which the insect has been seen no more. Its time of appearance was June, and it came to 'sugar.' In 1859, at Folkestone, I captured specimens of a Nonagria which bore considerable resemblance to this species, and which was returned by M. Guenée as N. concolor. Through the kindness of my friends Messrs.

Doubleday and Bond, who have lent me specimens of the true N. concolor for comparison, I am enabled to give the following characteristics, which I think justify the acceptance of my specimens as a species totally distinct from Nonagria concolor, and new to Science. In the following remarks I shall designate my specimens Nonagria Bondii.

"In addition to the larger size of Nonagria Bondii, and the difference in colour, the fore wings being constantly paler, the hind wings darker in N. Bondii than in N. concolor, there are other distinguishing characters. In shape N. concolor approaches that of a Glæa, N. Bondii that of a Noctua; for instance, the costa of the fore wings in N. concolor presents from the base to the middle a convex curve, and for the rest is straight, or if anything even slightly concave; while in N. Bondii there is a gradual convex curve from base to apex; if there is any straightness or approach to concavity it is on the basal side of the middle of the costa. Again, the hind margin of the fore wings is considerably more angulated in N. concolor than in N. Bondii; in the latter the curve is much less abrupt, gradual, and in some cases inappreciable. The costa and inner margin are also more parallel in N. concolor, and there is consequently less breadth of the fore wings from the costa to the anal angle; and the breadth at the insertion seems also greater in proportion in N. concolor than in N. Bondii. The hind wings are much more oval in N. Bondii, and are devoid of a concave notch a little below the costa which is constant in N. concolor. The general appearance of N. Bondii is much more slender than that of N. concolor, especially as regards the proportionate size of the thorax. The antennæ are much longer, legs darker, larger and much less hairy in N. Bondii than in N. concolor, indeed in the former the legs are comparatively almost naked. With respect to markings, there is a constant dotted line more or less distinct at the insertion of the cilia in the fore wings of N. concolor, totally wanting in N. Bondii. There is on the other hand a constant shade in the centre of the hind wings in N. Bondii, absent in N. concolor; and while the under surface of the fore wings is dark sooty gray in N. Bondii, it is pale brownish gray in N. concolor; this, too, applies to a certain extent to the under side of the hind wings, in which however other differences are visible. The palpi of N. concolor are larger, stouter and much more thickly clothed with scales than in N. Bondii, although the latter is the larger insect, and the palpal scales show considerable difference respectively under the microscope. The down from the tippet is very diagnostic under the microscope in N. concolor; each scale at its free end is notched with four or five deep serrations, while in N. Bondii these serrations are either entirely wanting or there are two very slight lateral serrations. Scales, from corresponding points in the wings of the respective species, present considerable differences, but owing to the difficulty of obtaining them all of the same size their comparison is not so satisfactory as I could wish.

"The above microscopic observations were made from insects of the same sex, namely, females; and when to these it is added that N. concolor used to appear from the beginning to the middle of June, mine from the end of June to the end of July; that N. concolor is a fen insect, mine a coast insect; that N. concolor used to 'come to sugar,' whereas I never knew N. Bondii to do so until the second flight (about 11.30 P.M.), I think that I have some reason in bringing this forward as a distinct species; and as it is on all sides admitted that if not N. concolor it is new to Science, I beg to maintain the latter, and propose for my insect the name of

NONAGRIA? BONDII.

Alis anticis amplioribus, ovato-triangularibus concoloribus osseo-albis, serie punctorum semicirculari inter marginem posteriorem mediumque ductâ, subtus tenebrosis; alis posticis ovatis fumeo-cinereis umbra centrali tinctis; fimbriis candidis; thorace et abdomine tenuibus; antennis longioribus.

Exp. al. 1 in. 2 lin. ad 1 in. 3½ lin."

Ravages of Hylobius Abietis.

Mr. Janson communicated the following extracts from a letter which he had addressed to Mr. Walter Elliott, of Wolfelee, Hawick, N.B., in reply to his request for information relative to the economy of Hylobius Abietis, and the plans best adapted to arrest the ravages of this beetle:—

"London, Sept. 18, 1860.

"My dear Sir,—Your favour, accompanied by specimens of Hylobius Abietis and twigs of larch from which they had gnawn the bark, reached me in due course on the 3rd. The interesting remarks on the ravages of the beetle, and the specimens, were communicated to the Society at its meeting on the same evening, and an account will appear in the 'Proceedings.'

"Having ransacked such foreign works as I possess which treat on insects injurious to foresters, for information respecting the Hylobius, the following memoranda will perhaps prove not altogether unacceptable.

"This beetle appears to attack indiscrimately all the species of fir cultivated in Germany, preferring however, according to Ratzeburg, Pinus sylvaticus and P. abies. In countries where firs are not grown this insect seems to be unknown.

"It is the perfect insect alone which is directly injurious. It gnaws the young shoots, causing them to wither. The extremities of a tree thus attacked (the most vigorous and healthy trees are invariably selected by the beetle) several years in succession, sickness and death inevitably ensue; in dry seasons especially, the mischief this beetle occasions in fir woods where it abounds, is almost incredible.

"The perfect beetles emerge from May to October, and copulation takes place from the period first named to about the end of June, but is rarely witnessed later in the year: the beetles which make their appearance after this time hybernate, and do not copulate until the ensuing spring. The female deposits her eggs, and the larvæ subsist, either in the stems of sickly or dead, standing or felled trees, or in the stumps and roots of those which have been felled remaining in the ground, and are therefore scarcely to be considered as directly injurious. Hence it will be obvious that by grubbing up all stumps, and keeping the plantations cleared of all sickly and dead trees, an important step will be made towards reducing the numbers of the beetles. All timber should be barked as soon after it is felled as practicable, as the females lay their eggs in the bark only. All dead branches likewise should be lopped off close to the stem.

"Ratzeburg mentions several plans adopted in Germany for entrapping the beetles: of these the most successful appear to be—

"1. Pits and trenches with perpendicular sides, dug at frequent intervals round the plantations and along the sides of the paths or road-ways, into which the beetles fall or fly, and from which, being unable to escape, they are to be taken and destroyed.

"2. Bunches of young fir boughs laid about the plantations or in the pits. These are to be shaken daily over cloths, and the beetles collected and destroyed. As soon as the boughs commence to dry they prove unattractive, and must be replaced by fresh ones. Ratzeburg informs us that 2500 beetles have been taken daily from 100 of these bunches or bundles.

"3. Strips of fresh fir bark strewn about the plantations with the inner surface downwards allure the beetles in great numbers; on lifting these the insects are found congregated upon and beneath them.—I remain, &c.,

"Edward W. Janson.

"To W. Elliott, Esq."

Notes on the Habits of a Species of Mantis found at the Cape of Good Hope.

Mr. Smith read the following communication from Mr. Trimen:—

"A Mantis taken on May 13th has, during the two months just elapsed, constructed four nests of eggs, at intervals of about a fortnight. I had the pleasure of seeing her construct one of these, and was rather surprised at her method of proceeding. I used to fancy that the eggs were arranged first, and the structure coated over with cement afterwards; but I found this to be a great mistake. The insect is grass-green, mandibles scarlet, fore tibiæ and tarsi yellow, and band along the abdomen crimson and white. The nest is constructed all in a mass, that is to say, the eggs as they emerge are completely imbedded in a frothy cement so as to be invisible. The emission of the mingled eggs and cement is incessant, and the structure is shaped as it proceeds by the extremity of the abdomen and a sharp trowel-like organ which protrudes from within the abdomen, while the two external filamentous anal appendages are constantly moving over the surface as if to smooth it. The peculiar projection at one end of the nest is the finishing point, and the insect, as if aware that it would drop off if left immediately after formation, sustains the little horn-like process between its anal plates for some minutes, until sufficiently solidified to sustain itself in position. I cannot imagine the use of this curious projection, unless it is to frighten marauding insects or other enemies from devouring the eggs. The eggs, when the cement has dried, give the nest a ribbed appearance: the structure is remarkably firm and hard when dry. The four nests are as nearly as possible of the same size, and of precisely similar shape. The manner of devouring the house-flies I feed my Mantidæ with is peculiarly remorseless and sanguinary. Once having seized its prey, with a sudden, embracing stroke of one or both of its powerful fore legs, the Mantis conveys it to its mouth, and immediately commences to devour it. There is no preparatory wounding or stupefying of the unfortunate victim; the devourer eats regularly down, generally commencing at the eyes, the unfortunate fly struggling to the last bit of muscle he has left; the fly's legs are always devoured, his wings but rarely. The Mantis when hungry would catch and eat portions of 'bluebottles,' but generally dropped it half-devoured, and always if I introduced an ordinary fly. One very large Musca vomitoria that the Mantis attacked, after she had just finished a nest, actually dragged the Mantis round the box, she devouring the back of its thorax all the time! These remarks may probably have nothing but their accuracy to recommend them."—*E. S.*

Curious Preservation of Human Eyes.—In the autumn of 1858 I chanced to be in the company of a stranger who had recently returned from South America, and I was shown one of a traveller's curiosities, with a request that I would say what I thought it was. In character it was not much unlike a fossil onion. Concentric zones of various shades of colour from pink to blue surrounded a luminous centre, bright as the brightest amber, and of like intensity. My first question naturally was, "Is it animal, vegetable, or mineral?" "Animal," was the reply. Now had it been vegetable or mineral I should not have been so much surprised. It looked like some amber ornament, and might have been polished and set as a brooch! "It is animal, it is an eye—a human eye. I have ninety of them." As I held it in my fingers, the pupil seemed to glare at me, so bright was it; the uvea, ciliary body and ora serrata, all were distinctly and definitely traced on one globe,—nay, even the radiated lines on the iris were noticeable. I asked for an explanation, and elicited the following:—"It is from an Indian cemetery near Arica, in Peru. The cemetery lies in a vale strongly impregnated with saltpetre, which seems to have acted on the humours of the eye, and given them fixedness and intensity. From some cause or other the burial-place has been long deserted by the Indians for one higher up the valley, and the bodies, being interred near the surface of the ground, have become exposed to view. I visited the cemetery at sunset, and noticed the peculiar glass-like appearance of the eyes. Some I removed from their sockets, and found them as hard as amber to the touch. Curiosity led me after to the spot, till I had collected quite a stock of eyes." But, I remarked, "May not the Indians, during some process of embalming, have substituted glass eyes in the place of the natural eyes?" "No," replied the stranger, "as I have them with the tendons and ligaments attached, and in some cases I had difficulty in extracting them from the skull." Such is the story, nearly in the words of the traveller, and I place it at your disposal, as you may probably wish to give it publicity. —*Peter Inchbald; Storthes Hall, near Huddersfield, October* 28, 1860.

Rabbit apparently fascinated by a Stoat.—As I was walking on the hill-side above West Creech, Farm, in Penbeck (the down was scattered with very low furze bushes), my attention was arrested by a cry of distress; it proceeded from a rabbit which was cantering round in a ring, with a halting gait. I watched it for some minutes, but as the circle became smaller and the rabbit more agitated I perceived a stoat turning its head with the rabbit's motion, and fixing its gaze upon it. I struck a blow at the stoat and missed it; its attention was thus withdrawn, and the rabbit ran away with great vigour in a straight direction.—*Henry Bond; Vicarage, South Petherton, Somerset, August* 14, 1860.

Hedgesparrow fascinated by a Snake. — Up the hill above Tyneham, towads the sea, I was struck by the shrill cry and fluttering agitation of a common hedgesparrow, in a whitethorn bush. Regardless of my presence, its remarkable motions were continued, getting, at every hop from bough to bough, lower and lower down in the bush. Drawing nearer I saw a common snake coiled up, but having its head erect, watching the sparrow; the moment the snake saw me it glided away, and the sparrow flew off with its usual mode of flight.—*Henry Bond; Vicarage, South Petherton, Somerset, August* 14, 1860.

A Tom Tit in Difficulties.—Last evening, as I and a friend were on our way to Dulwich Wood, on entomological thoughts intent, we saw at a gas-lamp — not a moth—but a blue tit (*Parus cæruleus*), hanging back downwards in the space left unglazed at the bottom. In our humane endeavours to rescue it from its dangerous position we only frightened it completely into the lamp, where it kept flying into and resting above the flame, till at last it managed to get out where it got in, no doubt considerably singed, if not burnt. What can have induced this bird to fly to a gas-lamp at that time of night? It could hardly have chased a moth there, as I fancy it is of strictly diurnal habits, and it could scarcely have selected the spot for a roosting-place before the lamp was lighted, as it would certainly have been scared by the lamp-lighter. I fancy that, having been at roost near the lamp, the attraction of the light had proved too much for it.—*Robert McLachlan; Forest Hill, October* 20, 1860.

Occurrence of the Little Bittern near Taunton.—On the 20th of August last a specimen of the little bittern was shot as it rose from a bed of rushes on the river Tone, about half a mile below this town. It is now preserved, and in the possession of Mr. Haddon, the person who shot it.—*W. F. Dewey; East Reach, Taunton, October* 15, 1860.

Occurrence of the Surf Scoter near Scarborough.—I have great pleasure in informing you that a fine mature specimen of that extremely rare duck, the surf scoter (*Anas perspicillata*), was shot by myself, on Monday, the 25th of October, on the rocks at Gristhorp, near Scarborough: it was swimming with another duck of its own size and colour, and, in all probability, of the same species.—*Alwin S. Bell; 11, Crown Terrace, Scarborough, November* 2, 1860.

Prognostication of an Early and Severe Winter.—Quantities of wild fowl have already been seen off our coast, besides many other indications of an early and severe winter.—*Id.*

Natural-History Notes from Bengal. By E. A. W. Tayler, Esq.

The following extracts from the letters of my friend Edward A. Wood Tayler, Esq., of Bamundie, Bengal, who is a most accurate observer of nature and a keen sportsman, will be interesting to your readers, as they contain truthful remarks on the habits of certain birds and animals.

R. H. T. Gilbert.

Kensington.

"Bamundie, near Kishnaghur, Bengal.

"I am in perfect health, and India seems the very place for me, but remember that I never touch a drop of anything but water, and whilst other fellows are obliged to lie down to get rid of the effects of the beer, &c., imbibed, at tiffin, I take my gun and go cruising about under the mango tops. About here there is not much jungle, and yet now and then you fall in with a leopard, but it is no end of a place for birds, and I never before saw such beauties as one sees from day to day

flying about everywhere. I enclose some feathers, but they are nothing to some that I mean to send you. Ducks, geese and snipes swarm in countless hundreds. I have also shot eight different kinds of kites and hawks, and some very large horned owls, also some very small ditto. I shot one day three beautiful fish-eagles. Old Forsyth* shoots better than ever since it has been rebored for me. A jackall, which is a most tough brute, I rap over as dead as a nail at forty yards. I wish I could give you a view of my room, hung all around with skulls of birds and animals, feathers and claws, and lots of other natural-history objects so dear to your eyes. I have lots of eggs, but I have had great difficulty in procuring them. A friend sent me two eggs of the alligator. I stayed a day with my friend Mr. S., who is a great shot and sportsman; of course we went out shooting, and although it was September, the worst month in the year, yet we managed to bag lots of green pigeons (capital eating are these fellows I can tell you), black and white curlews as they are called here, but one of these is the ibis I think; however, when you get the skins I intend sending you, you will be able to make out all these gentlemen. We also shot ducks, snipes, plovers, black partridges and quails. It is capital sport, as you never know what you may come in with in your walk. I also rolled over a fine tiger cat and two very small foxes; these latter were beautiful little creatures. I have killed lots of a bird here called goiles or snake-birds, because when swimming they sink so low in the water as only to show the head and neck: their feathers are very beautiful, and make splendid plumes when mixed with the crest-feathers of the padi-bird, a kind of egret I think, that is found in immense numbers all over the rice fields, whence its name. It is indeed a beautiful sight to see a flock of these birds; their snowy plumage becomes a most dazzling white under the fierce and brilliant light of the eastern sun, the dark green of the landscape and the coppery sky forming one of those pictures of Nature that only the true naturalist can thoroughly appreciate.

"The kingfishers out here are very brilliant, and beat every bird as far as plumage goes; they look like gems as they fly over the water. In habits and flight, as far as I have seen, they are similar to our own little friend in old England.

"I have had a tame mongoose given me; he will run after me like a dog; he hates blackies but loves snakes. Three days ago I saw a cobra in a hole of the garden wall, and after some little trouble I got

* His double gun is by the celebrated maker Forsyth.

him out and brought him in an earthen pot, called a gumla, in front of the house; I then called my friend 'Boots' (the mongoose), and it was very interesting to see the snake with his hood expanded standing erect on his tail watching the movements of 'Boots,' who took it rather easily for some time, but he knew what he was about, and when he did spring the snake was as dead as a stone, for 'Boots' had fixed him by the back of the neck, quite close to the head. It is wonderful that these little creatures never miss their aim. The house was overrun with rats before he came, but now there is not one to be seen. I have lots of things for you; no end of bottles full of sweet little snakes and beetles; for all the curious little things I catch I keep in good spirits. I have bagged no less than fifty flying foxes. I have killed bats of all sizes, from the flying fox down to the size of a humble bee."

* * * * * *

"In answer to your questions, 1st. I have not seen any pheasants, as I am a great way from the hills. I read your note signed 'Ramrod,' in the 'Field' newspaper, on the introduction of foreign game. 2nd. I have killed large game, as my last letter shows how I slew a tiger-cat, leopard and brace of fine boars, on foot in the jungle. 3rd. I have seen a great number of mango birds; they are very common in this district, although not in other parts of Lower Bengal. 4th. I have not, I am sorry to say, skinned any birds as yet, having only shot them for their feathers or for the table; the reason is that the weather has been so fearfully hot; but in the cold weather I intend making a good collection of bird-skins, and will send them to you; the principal shall be owls, hawks, eagles, &c. 5th. I have taken great notice of the habits of the birds, &c., that I happened to see, and you shall have these notes. The numbering system that you recommend is just the thing for me, as I do not know the names of half the things I kill. 6th. I have studied the habits of the cobra di capello snake closely, and shall give you a few remarks after finishing the answer to the question concerning the habits of the snake bird. These birds are mostly found in pretty good numbers in the large unfrequented inland lakes, and when in the water all the body is hidden from view, only the head and neck being visible. They so resemble a snake when in the water that the most practised eye would be deceived at the distance of fifty yards. The neck is long, as is also the head and beak, and the neck has a most graceful motion when the bird is swimming. They are great divers, and will remain under water for the space of a minute and a half, and during that time will swim a very considerable distance. They are clumsy at rising, but when once

fairly on the wing fly at a great rate. The feet are large and webbed, like other divers and ducks; the body is of a longish shape; the skin of the neck is very beautifully marked, and it will stretch to a great extent. I intend sending you the skin of the male bird this cold weather, and you will then be able to determine its species correctly. Now for a few words on the cobra, "the most deadly of Indian snakes." I have been lucky enough to come across and kill fifteen of them since my arrival here. The only thing I have noticed in them is that they are far more cunning than any other snake, and when hotly chased will not hesitate to stand up and show fight, making a kind of blowing noise all the while: the natives say that if the cobra does bite when in this state of passion death is certain within an hour. One did a most curious thing to me; I was in full chase, and about twice his length behind him, when he suddenly raised himself backwards, and by so doing as near as possible laid hold of my leg, but on finding he had missed his aim he slunk off at a rapid pace, when I settled his hash with two cracks of a bamboo. I once caught a very large cobra in a curious way. This worthy used to live in a very thick wall in the hen house at Katchekatta, and nearly every night destroyed from three to five birds: all endeavours to catch him having heretofore failed, I hit upon the following plan. Before his hole I drove a large nail into the ground, and to this I fastened a bit of strong whipcord, about two feet long; at the end of the cord I lashed a fine sharp eel-hook, and upon this I tied with a thread a nice tempting lively yellow frog; then, leaving the yellow gentleman for the night in a very jumping humour, I retired, and early the next morning sure enough, as I expected, the frog and half the twine had disappeared down the hole. I now put a stone against the hole, unfastened the end of the string that was tied to the nail, and this I again fastened to a stout stick; then, removing the stone, with one jerk I brought the writhing cobra to light, who, never expecting this kind of treatment, growled like the very devil. I skinned him, as he was the largest I ever saw, being five feet long.

"Getting birds' eggs in this country is very difficult work, the natives being such fools that they never know how to find a nest, and the only way I have got the few now in my possession was from watching the birds about a tree and then sending a man up to bring down the eggs.

"The birds that have most taken my fancy are the four kinds of game about here, but which, I am sorry to say are fast disappearing before the steps of civilization, and very soon not a partridge will be found

about this part of Bengal. I now send a sketch from a dead bird just rolled over by old Forsyth, the chicose partridge of India; and also another sketch, being the gray partridge; both are to the very life, although I did them myself. I intend, when I get a chance, to send you a sketch of both the black and painted partridge. This latter bird is rare about here, I having only shot one.

"I have just obtained five splendid Longicorn beetles. My insect collection is going on famously.

"E. A. W. Tayler."

Captain Taylor's Sea Serpent. — A friend, who has the opportunity of communicating with Melbourne on the subject of the young sea serpent which Captain Taylor says (Zool. 6985) he presented to the Museum at Melbourne, has ascertained through Mr. Coates, of that town, that Captain Taylor is so far correct, that he did at the time specified present a specimen of Pelamys bicolor to the Museum in question, and Professor M'Coy exhibited the same to Mr. Coates. Of course there is no rational ground for concluding that this small sea snake is the young of any such gigantic creature as Captain Taylor has described.—*Edward Newman.*

A Female Adder Swallowing her Young. — Walking in an orchard near Tyneham House, in Dorsetshire, I came upon an old adder basking in the sun, with her young around her; she was lying on some grass that had been long cut, and had become smooth and bleached by exposure to the weather. Alarmed by my approach, I distinctly saw the young ones run down their mother's throat. At that time I had never heard of the controversy respecting the fact, otherwise I should have been more anxious to have killed the adder, to further prove the case. As it was she escaped, while I was more interested in the circumstance I witnessed than in her destruction.—*—Henry Bond; Vicarage, South Petherton, Somerset, August* 14, 1860.

Discovery near London of a Physa new to the British Fauna.—Early last spring I observed in a water-tank, in the Royal Botanic Garden at Kew, a mollusk, which at the time I supposed to be the Limnæa peregra, but which on a closer examination, a short time since, I found to be a species of Physa, and quite distinct from either of the indigenous species P. fontinalis and P. Hypnorum. I became interested in the discovery, and I set to work immediately to endeavour to find out by what means it came there, and in order to ascertain its species I forwarded a few specimens to an eminent conchologist of my acquaintance, who pronounced it to be the Physa rivalis of Maton and Rackett. I sent some afterwards to the British Museum, and was informed that, according to the specimens there belonging to the collection of M. D'Orbigny, it was the Physa acuta of Draparnaud, and that its native habitat was the West Indies. I was led, therefore, to infer that it had been imported with some exotic aquatic plants, but upon giving the subject still further consideration two facts presented

themselves to my mind which militated strongly against the presumption of its being a native of the tropics, first, because tropical aquatic plants are only received at Kew in a dry state, and I question whether a mollusk so decidedly aquatic as the Physa could in any stage of its existence retain its vitality, and survive the lengthened period occupied in the transmission of the plants to this country; and secondly, assuming that it did so survive, could anything tropical having life retain its vitality after being exposed *al fresco* to the inclemency of a long and severe winter like the last? Being satisfied, therefore, that it was not an exotic species, and that its native habitat was not within the tropics, I continued my investigation, and at length I obtained a clew which brought to my recollection that nearly twenty years ago I collected some aquatic plants in a certain locality in the vicinity of the metropolis, for the use of the Royal Botanic Garden at Kew; and as I have just discovered that the Physa is found in that locality, as well as in Kew Gardens, the inference is obvious that it must have been introduced to the Royal Gardens with the aquatic plants in question, where it must have remained ever since. But I am constrained to refrain from mentioning this locality at present, from the fear that if known the Physa might become extinct there, owing to the rapacity of collectors in collecting specimens.—*A. Choules; Royal Gardens, Kew, October* 20, 1860.

On the Habits of Phronima atlantica.—Although it is perfectly true of the large-headed transparent shrimps comprising the family Phronomidæ, that they are more or less parasitic, being found stowed away in the pouches and other cavities of the equally pellucid Acalephæ, yet sometimes they swim freely about and are frequently taken in the towing-net. I have taken a specimen from the cavity of a large Salpa, so they may be said to be parasitic on Mollusca as well as on Acalepha. In its free and independent state, when observed in a vessel of sea-water, Phronima atlantica is perfectly transparent, and the slender legs and tumid chelæ of the fifth pair are covered with red-brown dots. In its habits it is somewhat peculiar, even for a shrimp. Suspended head downwards in the water, it remains motionless like a spider in its web; the long hind legs extended with the tarsal joints all bent back; the prehensile fifth pair, with its gibbose spotted hand, arched inwards, and the post-abdomen curved forwards towards the head. In this attitude of attention he remains eagerly on the watch, and while staring with its great eyes, separating its jaws, and keeping ready its mandibles, the false feet of the abdomen are incessant at work producing a current towards the mouth. No sooner is some minute organic particle drawn within the influence of the vortex than the head and tail of the Phronima are brought together, and the object is immediately seized, if large enough, by the thumb and finger of the freckled hands, conveyed to the mouth and greedily devoured. When placed in spirits the skin becomes opaque, the colour of the legs is changed into a pale yellow and the red-brown spots disappear. When we compare the delicate oceanic organisms seen fresh from the deep sea with the specimens in our bottles, well may we mournfully exclaim with St. Pierre, "Our Books are but the Romance of Nature and our Museums her Tombs."—*Arthur Adams.*

Note on the Rate of Speed of Flight of a Butterfly. — October 12th, at 5 p.m., on board the "Pera," some twelve miles east of Cape Bon, Africa, when sitting in the after part, I observed a painted lady butterfly. It came from the sea and readily overtook the steamer, which was then making ten and a half knots an hour. I observed the insect for about twenty-five minutes, during which it made three distinct flights from the ship, and each time (as I thought) I saw it alight on the waves. The wind was nearly ahead and tolerably strong, and the log was heaved at the time, by which I determined the rate of the vessel. As I have never in my entomological reading met with any one actually testing the rate of speed of the flight of a butterfly, I deem this note worthy of preservation in the pages of the 'Zoologist.' I may add that the insect alighted and again flew away, apparently quite untired — soaring high and flying at times directly aft.—*C. Horne; "Pera," October* 12, 1860.

Critical Notes on and Diagnostic Characters of the New British Sesia of 1860. By J. J. Reading, Esq.

Lately I have been engaged in trying to make out this species, and believe I have succeeded satisfactorily in identifying it. Mr. Newman, in the 'Zoologist' (Zool. 7153), claims the honour of first introducing this species to the British list, and refers the reader to his "Monographia Ægeriarum Angliæ" (Entomological Magazine, vol. i. p. 79). Mr. Newman considers this insect to accord with Trochilium Muscæformis of Esper. In this I consider him correct, but the description in his Monograph is so short, and some portions of it so unlike the insect, that I need not say that the description is insufficient to identify the species, but Mr. Newman, in the 'Zoologist' (Zool. 7153) amends his description of the monograph: this amendment is more faulty than the first description, and I feel certain that Mr. Newman will not take it amiss if I venture to point out the mistakes:—"Antennæ fuscæ, apice nigricantes, medio pallidiores." (*Vide* Monograph). The foregoing description certainly does not accord with the characters of Esper's Muscæformis, nor indeed with the best description that has hitherto appeared of Sesia Philanthiformis, *viz.*, that by Dr. Staudiger, in his 'Berlin Species.' It runs thus: "Antennæ articulis 45 compositæ, cæruleo-nigræ, articulo basali infra flavescente in ♀ apicem versus supra squamis paucis albis, maculum conformantibus mixtus, in ♂ dentibus aculio instructis." It is plain these two descriptions do not refer to the same insect.

Next to be considered are Mr. Newman's amending remarks on this

species (Zool. 7153): "I may, however, remark that the number of pale rings on the abdomen is three only, instead of five." (Monograph says five or six, *viz.*, "quinque aut sex cingulis flavescentibus.") Now, though specimens are known having two, three, and seven belts, yet it is remarkable that there are none recorded having five or six belts; therefore, in this particular, the amendment is nearer an improvement, as it mentions the typical number of annuli on the abdomen, *viz.*, three. Mr. Newman continues, "The indistinct whitish annulus on the antennæ of the female distinguishes this from all cognate species." Taking Mr. Newman's "annulus" to be the "macula" of Dr. Staudinger, the conclusions come to are certainly wrong, as this same marking is in the other sex of the same species, but indistinctly, and it is also on the antennæ of both sexes of Chrysidiformis; and in the 'Zoologist' (Zool. 4928), Mr. Newman describes the antennæ of the female of S. Scoliæformis, "with a long whitish space on the apical portion." In a male of this species that I possess (it was sent to me by the late discoverer) the whitish macula is indistinctly to be seen. In the female of S. Ichneumoniformis what is termed "pale," "paler," in the middle of the antennæ, is but a modification of this marking, therefore I take it that the mark mentioned would not in itself be sufficient to "distinguish it from all cognate species."

It is said that the specimen from which Mr. Newman drew up his description, and which was printed in his Monograph, "is but a damaged specimen of S. Ichneumoniformis." If this assertion be true, it will account for the discrepancy between his description and other authors. I will not say (until I have seen the specimen) whether it is that insect or not, but of this I am certain, *viz.*, that the greater part of his description applies more to S. Muscæformis (*Esper*) than to S. Ichneumoniformis of authors. Having good specimens of the new captures,—one, a fine female, taken by myself at Whitsand Cliffs, Cornwall, last June; others taken by Mr. King, of Torquay, with notes of my own thereon. I have also two continental specimens, obligingly lent to me by J. R. Hind, Esq., for the purpose of helping me to identify the species; and George Wailes, Esq. kindly furnished me with copies of the descriptions of Sesia Philanthiformis, (*Lasp.*, *Och.*, *Boisd.*). Upon the before-mentioned materials I chiefly rely, and have satisfied myself that the new Sesia is S. Philanthiformis (*Linn.*, *Hub.*, *&c.*) and S. Muscæformis (*Esper*). Both these names are in the field, but one is quite sufficient; I am not certain which has priority, S. Philanthiformis has had its present name from the time

of Linnæus, and been called the same by Hubner, Ochsenheimer, Godart, Boisduval and Staudinger, and even if S. Muscæformis has the right in priority, this is not the time to make any alteration, as diversity of nomenclature between our lists and those of the continent is very undesirable, If any alteration ever takes place it must be done when a thorough revision of the group is made; for, as there is another species bearing the title of Muscæformis by Duponchel, Boisduval and Herrich-Schæffer, it would not do to have (particularly in one genus) two insects bearing the same name, I shall therefore introduce it by its usual appellation and give a description.

SESIA (*Fab.*) PHILANTHIFORMIS, *Linn., Lasp.*

Sesia Philanthiformis, *Linn., Lasp., Hub., Och., Godt., Boisd., Staud.*
Trochilium Muscæformis, *Esper.*

Fronte nitido-cæruleo-nigro. Palpis albis, margine externo apiceque nigris. Antennis cæruleo-nigris, in mare dentibus spinatis et ciliatis, infra flavis plus vel minus a base, in fœminâ infrà fuscis, suprà apicem versus maculâ magnâ albâ; qua maculâ in mare imitata est squamis parcis fuscis vel flavescentibus aliquando obsoletis. Abdomine suprà cæruleo-nigro vel metallico-fusco-nigro squamis flavis consperso, in insectâ typicâ cum annulo in marginibus posterioribus 2, 4, 6 segmentorum, in varietatibus 1, 2, 3, 4, 5, 6, vel 2, 4, vel 2, 7 argenteo-niveo sæpe flavescente. Fasciculo terminali in mare suprà subfusco, infrà flavescente, in fœminâ suprà centro sordido et subflavescente, lateribus subflavescente, infra sordido.

Size of the male 7—8 lines; of the female 6—9 lines.

Forehead bluish black, two chalk-white patches in front of the eyes. Palpi chalky white, with the outer margin and apex black. Posterior margin of the head (collar) yellow. Antennæ in the male bluish black above, underneath more or less yellow from the base, but discontinuing a third (if not before) from the apex; in the female brownish underneath; a third from the apex on the upper side is a large white patch (the patch varies), which in the male is represented by a few obscure brownish yellow scales, and in some specimens are obsolete. Prothorax and mesothorax on the upper side are shining, bluish black, on which is a dorsal yellow line, more or less narrow or shorter and longer. Metathorax brownish black above, blended with yellow scales, having on each side long yellow or hoary hairs.

Tegula bluish black, shining, the inner margin broadly yellow. Fore wings: costa bluish black, bluish brown or blackish brown, on the extreme edge near the apex margined with bright yellow scales; outer and inner margins (and sometimes the central band) brownish black; the terminal band is diversified with three or four wedge-shaped pale yellowish patches; the usual longitudinal cuneiform area and the external rotundate areoli are pearly white, the edges of the former and the nerves passing through the latter with very pale yellowish or white scales; the nerves through the rotundate areola very much mixed with brown; a streak just above the inner margin more or less yellow (it is, however, wanting in some specimens and is replaced by a hyaline space). Hind wings: the fringe line broadly brownish black, widest in the middle and gradually narrowing to the base of the wings; fringes to all the wings ashy gray, with the apices of the scales whitish, much whiter towards the base of the hinder wings. Coxæ growing dusky, the front ones conspicuously white, the hinder ones variegated with white. Femora of a dusky colour, the front ones approaching a clay-colour on the upper side, hinder ones have the outer margins somewhat yellowish. Tibiæ of a dusky colour, the front ones yellowish above, the hind ones are sprinkled with chalk-coloured scales; the spurs, the terminal hairs at the joints and tufts on the outer margin more or less yellow. Tarsi: upper side whitish, clay-colour or yellow, beneath brownish. Abdomen above iridescent, brownish black, besprinkled with yellow scales; especially on the middle of the segments; on the under side the whole (in some specimens) is covered with pale yellow scales; on the posterior margins of the second, fourth and sixth segments with a narrow silver-white or snow-white belt. The terminal tuft in the male dusky above and yellow beneath; in the female dull yellow, and dusky intermixed in the centre above, dull yellow at the sides and dusky beneath.

Dr. Staudinger gives three varieties in his 'Berlin Species':—

"*α*. Abdominis segmentis 2—7 postice tenuiter niveo sive flavido annulata."

"*β*. Abdomen linea laterale, latu distincta flavescente.

"*γ*. Neuris antennarum pauci tantem dentes aculeis instructi; areæ tres permagnæ, externæ areola quinta ceteris non brevior."

I can add to the above two more varieties, *viz.*:—

δ. Abdomine nigro attenuatissimo versus anum cum annulo subtili albo in marginibus posterioribus 2, 4 segmentorum ♂.

ε. Omninò perminutum exemplum circiter 6 lineæ in expansione alarum; abdomine pariter lato per totum, margine posteriore omnium segmentorum annulato ex albido præter postremo ♀.

J. J. READING.

Plymouth, October 19, 1860.

Description of the Larva of Thyatira derasa. — Rolls in a ring when touched. Cylindrical, rather stouter anteriorly, velvety and somewhat transparent. Colour reddish brown, with a slender median black stripe, and a circular conspicuous white spot on each side of the 5th segment, sometimes a smaller white spot in the same position on each side of the 6th and 7th segment: the belly is much paler than the back: the spiracles are black. Feeds on Rubus fruticosus (bramble), and is full fed on the 12th October. I am indebted to Mr. Thomas Huckett for this larva, as well as for most of those which follow.—*Edward Newman.*

Description of the Larva of Ceropacha flavicornis.—Head pale wainscot-brown, with a black spot on each cheek near the mouth. Body dingy yellowish green, the 2nd segment having six black spots, all of them close adjoining the head, the two dorsal ones larger than the rest; on each of the following segments are five black spots, the largest of which constitute a dorsal series, the second, smaller, constitute a supra-spiracular series, and the third, the smallest, an infra-spiracular series; each of the larger black spots has a row of three white dots above it and one white dot below; the 3rd and 4th segments have a transverse band or belt of twelve white dots. It feeds on Betula alba (the birch) of which it rolls up the leaves into a kind of case, and only comes partially out to eat: it is almost impossible to beat this larva: in order to obtain it, the rolled-up leaves must be sought out and picked: full fed the 10th July.—*Id.*

Description of the Larva of Dipthera Orion.—Whilst staying in Hampshire this summer I took a single female D. Orion. As she was slightly worn and chipped I kept her in the hope of obtaining eggs, and was not disappointed. These in due time hatched, and the young larvæ fed well till their last moult, on birch. They then without any apparent reason began to die off. I introduced some oak twigs, for which the birch was immediately deserted, but out of a numerous brood I only succeeded in obtaining four pupæ. I am inclined to think that in a state of nature this larva feeds indiscriminately upon oak and birch, wandering from one to the other. I never but once beat the larva; this was in Suffolk, where I thrashed two out of a birch bush in a wood near Ipswich, and thence it was that I fed my young larvæ at first solely on that tree. The following description of the larva may be acceptable to the readers of the 'Zoologist':—Back bluish black. On the fourth, sixth and ninth segmental divisions a large primrose-yellow blotch, and smaller ones of the same colour on the third and anal segments. On the second and third segments the rudiments of two central primrose-yellow dorsal lines. Dorsal and lateral segmental divisions girt with a belt of orange and primrose-yellow tubercles surmounted by tufts of pale reddish hair. Subdorsal lines primrose-yellow, interrupted and studded with various sized primrose-

yellow spots. Lateral lines four or six in number, black, interrupted with yellow or orange; intermediate spaces yellow. Head black, slightly marked with yellow. Belly dirty gray, spotted and marked with black and white. Feet and prolegs yellowish, with black markings. Full fed the beginning of September. In appearance strongly resembles the larva of Liparis Salicis. In habits allied to the larvæ of the genus Acronycta. The eggs are flat and yellow. The pupa is enclosed in a cocoon of gnawed bark or rotten wood. It is dull red and very like that of A. Alni.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Herts, October 27, 1860.*

Description of the Larva of Acronycta tridens. — Does not roll in a ring or feign death when disturbed. Body somewhat incised at the interstices of the segments, hairy, and having a conspicuous hump on the 5th and 12th segments. Head black, shining, but emitting so many hoary hairs, as to give it a gray appearance. Body black, beautifully ornamented with orange and snow-white markings: 2nd segment black, with a small median white spot on the back; 3rd and 4th segments slightly tumid on the back, the centre of each swelling being orange-yellow; on each side of each of these segments is also a bright orange spot; 5th segment with a conspicuous median hump, velvety black on the summit, but hoary behind, and having one white spot on each side; a little distance below this is a pair of white spots closely approximate and on each side of them a larger orange spot; on the 6th, 7th, 8th, 9th, 10th and 11th segments is a median stripe, rather narrowed, entire, and of an orange-yellow colour in the centre of each segment, rather dilated, longitudinally divided and dingy white in the interstices: on each side of each segment, below this median stripe, are two white spots, one above the other, like the colon in printing, and there are three orange spots of different forms below the lower of these white spots; the 12th segment is decidedly humped, and has a conspicuous snowy white mark on the summit shaped something like a cross, but the hinder radius of the cross is sometimes wanting; the hind margin of this segment has a broad orange border; the 13th segment terminates in a kind of horn, quite black and directed backwards: below the lateral series of orange spots I have described, is a lateral stripe mottled with yellowish markings, among which are situated the spiracles, and below this again is a slender interrupted orange stripe. Feeds on Betula alba (birch), and is full fed on the 8th October.—*Edward Newman.*

Description of the Larva of Acronycta Psi.—Head rather large. Body hairy, with parallel sides, but humped on the back; the first hump is slender, long, erect, horn-like, and seated on the 5th segment; the second hump is shorter, broader, and on the 12th segment. Head black, hairy, shining, its divisions very convex; 2nd segment black, with a very narrow median yellow line; 3rd, 4th, 6th, 7th, 8th, 9th, 10th and 11th segments with a broad median yellow stripe and a median square spot of the same colour on the hinder part of the 12th segment; the horn-like hump on the 5th segment is intensely black and clothed with crowded short black hairs, intermixed with scattered long ones; on each side of the median stripe is an equally broad jet-black stripe, and in this on every segment, from the 5th to the 12th, both inclusive, are two transverse bright red spots, with two minute whitish warts between each pair, the warts emitting black bristles: below the black stripe on each side is a broad gray stripe emitting gray hairs, and including the black spiracles; this gray stripe is reddish on the anterior segments, the intensity of the red increasing towards the head. Belly, legs and claspers dingy flesh-coloured. Feeds on Cratægus oxyacantha (white-

thorn), Pyrus communis (pear), &c. Full fed on the 16th September. — *Edward Newman.*

Description of the Larva of Acronycta leporina.—When disturbed falls off, and for a short time feigns death, in a semicircular posture; but its outline is concealed by the length of its hairs. Colour pale delicate green, completely covered with long curved silky hairs, all of them directed backwards; these hairs are either hoary white, or delicate pale canary-colour, or more decidedly yellow, and the body has a tendency to a similar variation in colour, although its normal tint is green: there are small erect fascicles of short black hairs on the back of the 4th and 6th segments, and single erect black hairs in a row on both sides. It feeds on Betula alba (birch), and is full fed on the 20th of September, when, concealing itself in a crevice of the bark, it makes a little excavation, in which it changes to a pupa, and remains in that state all the winter. In confinement it will gnaw a hole in cork about the circumference of its body, and after entering, gum up the mouth of the hole, so that its ulterior proceedings are completely concealed.—*Id.*

Description of the Larva of Acronycta Ligustri. — Will not roll in a ring when handled. Head delicate green and almost transparent, very shining, the mouth dark brown or almost black. Body glaucous-green, with a very narrow median white stripe down the back, not always extending to the 2nd or 13th segment; another stripe, rather broader than the median stripe and of a yellowish white on each side, extends from the head the entire length of the larva; this is about equidistant between the dorsal stripe and the spiracles; each segment emits eight, ten or twelve delicate silky-looking bristles. Feeds on Ligustrum vulgare (privet), and is full fed on the 26th of September.—*Id.*

Description of the Larva of Acronycta Rumicis.—Rolls in a loose ring when touched; has all the segments distinctly tumid, and the interstices between them deeply incised, as in the fasciculate larvæ of the Saturniadæ. Head small, shining and black, and emitting a few ferruginous hairs: each segment of the body has a circular series of ten warts, and each wart emits a number of stiff, straight, ferruginous bristles, which radiate from the wart as from a centre. Colour intensely black above and below; down the centre of the back is a series of orange-vermilion markings, two on each segment, except the second; the first of these bright markings is longitudinal, the second transverse; on each side of this median series is a subdorsal series of snowy-white markings, indistinct on the 2nd and 3rd segments, and absent from the 4th; the spiracles are snowy white, and beneath the spiracles on each side is a variegated stripe passing through every segment, except the 13th; on each segment this stripe is orange-red in the middle, yellow-white on the sides. Feeds on Urtica dioica (stinging nettle), and is full fed on the 20th of September.—*Id.*

Description of the Larva of Mamestra Persicariæ.—Rolls in a tight ring when disturbed. Head rather small and partially withdrawn into the 2nd segment, when at rest. Body smooth, very stout, attenuated anteriorly; 12th segment largest, tumid, and obtusely humped. Colour various, bright green, dingy green, rosy brown or dark brown; as in most other cases where this difference of colour prevails, the brown specimens produce males, the green ones females: in the following definition I describe only the intensity, not the colour of the markings. Head shining, pale, mottled with darker; 2nd segment with a nearly square dark velvety patch on the back, bounded on each side by a longitudinal white line, and being intersected in the middle by a third longitudinal white line; a pale narrow median stripe com-

mences at the termination of this short white line and terminates on the 12th segment; on each side are two series of oblique dark markings; those of the upper series commence on the 5th segment and are continued to the 12th, each commencing about the middle of the side and passing obliquely upwards and backwards to the median stripe, and there meeting a corresponding marking on the opposite side and forming a series of V-shaped markings, the points of the V's directed backwards; those V's on the 5th and 6th segments have the greatest intensity; the 12th segment is also much darker than the rest, but the dark portion has lost the V-shape: there is a slender dark rivulet stripe on each side below the V-shaped markings, and from this descend five other oblique markings, taking an opposite direction to the upper ones, and terminating in the claspers; in the upper part of each of these is situated a white spiracle; the 12th segment has a pale squarish patch behind: the anterior part of the body is dark beneath. Feeds on a great variety of plants, and is particularly fond of elder; is full fed at the end of September, and buries itself in the earth in order to undergo the change to a pupa.—*Edward Newman.*

Description of the Larva of Agrotis præcox.—Head very pale brown, broadly notched on the crown, a dark V-shaped mark pointing backwards on the face. Colour of the body very various; a median dorsal series of longitudinal gray markings, each extending almost the length of a segment and dilated posteriorly; these markings are margined on each side by others of smoky brown, which are narrowed to mere lines in front, but dilated posteriorly; on each side of the narrowed portion is a spot of the same colour: all the aforesaid markings constitute a variegated median stripe; on each side of this is a ferruginous stripe interrupted at the segmental divisions, and below this on each side is a narrow stripe of smoke colour; then a narrow gray stripe, and then a broad smoke-coloured stripe extending to the spiracles, which are black; a gray stripe below the spiracles. Belly dingy gray. Feeds on Alsine media (chickweed); full fed at Midsummer. I am indebted to Mr. Gregson, of Liverpool, for this larva.—*Id.*

Description of the Larva of Trachea piniperda.—Head pale wainscot-brown: body clear pale brown, with five longitudinal white stripes, one of which is median, passing down the very middle of the back; the next on each side is subdorsal, and is bordered above by a delicate jet-black line; the next on each side is spiracular, and is accompanied beneath by an orange stripe: on all parts of this larva are scattered black dots, but I can find no order in their distribution. Feeds on Pinus sylvestris (the Scotch fir), and is full fed on the 10th of July.—*Id.*

Description of the Larva of Orthosia instabilis.—Rolls in a ring when touched. Head green, shining, unspotted. Body bright pea-green, with a whitish ring immediately behind the head, a narrow whitish stripe down the very middle of the back, another on each side supraspiracular; intermediate between the dorsal and supraspiracular stripes is another indistinct stripe, composed of a series of whitish dots: every part of the larva is sprinkling with these whitish dots, except the belly, which is sprinkled with black dots; the disks of the claspers are also intensely black: occasionally black dots of uniform size, but at irregular distances, appear on the back and sides. It feeds on oak, and is full fed on the 10th of July: it buries itself in the earth to assume the pupa state.—*Id.*

Description of the Larva of Tæniocampa gracilis.—Rolls in a ring when touched. Back broadly dull green, with three paler narrow stripes, and between these paler

stripes are a series of pale dots: the broad green portion of the back is bordered on each side by a smoke-coloured stripe, the upper margin of which is suffused and indistinct, the lower margin sharply defined and very distinct; on each side below the smoke colour is a pale green stripe, paler still at both its upper and lower margins. Belly and claspers pellucid green. Feeds on Salix capræa (sallow); full fed on the 5th of July. I am indebted to the Rev. J. Hellins for this larva.—*Edward Newman.*

Description of the Larva of Hoporina croceago.—Rolls in a ring when touched. Colour wainscot-brown, tinged with orange, and delicately mottled with the same colour, of a rather darker hue; this darker colour is very apparent in a V-shaped mark on the back of every segment, the apex of the V pointing towards the tail of the larva. Feeds on oak, and is full fed by the 5th of July. I am indebted to the Rev. J. Hellins for this larva.—*Id.*

Description of the Larva of Dianthecia capsincola.—Rolls in a ring when touched. Head rather small. Body smooth, attenuated at both ends. Head pale brown, very shining. Body dingy brown, opaque, with a very slight indication of a median stripe, and having each segment marked on the back with a somewhat obscure smoke-coloured V-shaped mark, the apex of which points towards the tail, and near its apex each V encloses a small transverse bar of its own colour, and at each extremity of each bar is a nearly circular dot still of the same colour; the spiracles are black, and immediately above each is a slight swelling. Feeds on the seeds of Lychnis vespertina (the white campion): it makes a perfectly round hole in the capsule, and usually feeds with half its body hanging out of the hole: it is full fed on the 4th of October. I am indebted to Mr. C. J. Biggs for this larva.—*Id.*

Description of the Larva of Euplexia lucipara. — Rolls in a very rigid ring when touched. Head shining, pale pellucid green: body opaque, but delicate green on the back, gradually paler on the sides until this colour merges in a white stripe below the spiracles; the belly below this white stripe is of a more intense green than the back; on each side is a series of rather darker oblique lines than the rest of the back, these are very indistinct; meeting on the back they combine to form indistinctly pronounced V-shaped markings pointing backwards, and their apices meeting on a central very narrow paler stripe; there are two conspicuous white dots on the 12th segment, and others less observable on various parts of the body. Feeds on birch: I beat several of these larvæ full fed on the 16th of September.—*Id.*

Description of the Larva of Hadena oleracea.—Rolls in a ring when disturbed. Usual colour pale delicate green: less commonly clear transparent brown, always having a narrow bright yellow stripe immediately below the spiracles; above this yellow stripe is a less distinct smoke-coloured stripe, which gradually vanishes into the green of the back: on the back of every segment are several jet-black dots; on the 2nd, 3rd and 4th segments these dots form a direct transverse series, but not on the following segments; on the sides of the larva below the spiracles are three or four more of these black dots, and on the 6th, 7th, 11th and 12th segments there are black dots on the belly: in addition to these somewhat conspicuous black dots, the back is sprinkled with multitudes of ocellated and very minute white dots. Feeds on Urtica dioica (nettle), Ulmus campestris (elm), several species of Rumex (dock) and many other plants. Full fed on September 26th: buries itself in the earth to assume the pupa state.—*Id.*

Description of the Larva of Hadena Pisi. — Rolls in a ring when disturbed. A very beautiful larva. Head shining, very pale green; a broad median stripe on the back olive-green, most delicately irrorated and margined with black; on each side of this a narrower stripe of bright clear yellow; again, below the yellow stripe a broader stripe of olive-green, which, like the median stripe, is delicately irrorated and margined with black; then follows, on each side, a narrower stripe, the upper half of which is white, the lower half yellow; this stripe includes the spiracles: belly pale green, irrorated with black along the spiracular line; legs and claspers pale green. After the last change of skin, the green parts frequently become rich purple-brown. Feeds on Pteris aquilina generally. Found by Mr. Thomas Huckett, feeding on Betula alba (birch). Full fed 29th September.—*Edward Newman.*

Description of the Larva of Hadena contigua. — Rolls in a ring when touched, but soon unrolls itself and commences crawling with great rapidity. Head shining, dingy green, reticulated with rufous-brown: body orange-ochre, inclining to rufous on the back, dingy yellowish green on the sides and belly: the rufous hue of the back is due to reticulated markings, which are crowded and clustered in certain parts so as to form a series of eleven Vs down the middle, the apex of each V pointing towards the tail; a narrow and interrupted rufous stripe includes the spiracles. Feeds on Betula alba (birch) and Quercus Robur (oak). Full fed on the 26th September.—*Id.*

Description of the Larva of Xylocampa lithorhiza.—Rolls in a ring when touched. Attenuated towards the head, and having the segments slightly prominent and well defined. Pale wainscot-brown, with a still paler median dorsal stripe; on the 8th segment is an ill-defined dark brown blotch on the back, and there are several irregular narrow dark lines on each side. Feeds on Lonicera periclymenum (honeysuckle), and is full fed on the 5th July. I am indebted to the Rev. J. Hellins for this larva. —*Id.*

Description of the Larva of Erastria venustula.—Does not roll in a ring or appear to feign death: smooth velvety, rather tumid in the 4th and 5th segments, and evidently connected at the interstices of the segments: colour purplish brown, with a paler median dorsal stripe indistinct throughout, and almost obliterated on the 3rd and 4th segments; there is also a rounded spot of the same pale colour as the median stripe on each side of the 5th segment. Feeds on the yellow blossoms of Tormentilla vulgaris (the common tormentil), and spins a slight cocoon on the surface of the earth about the 26th of August, when it is full fed. I am indebted to Mr. C. J. Biggs for this larva.—*Id.*

Description of the Larva of Abrostola Urticæ. — Never rolls in a ring, but sometimes feigns death and falls off its food when disturbed, assuming a bent posture. Attenuated in front, the 2nd, 3rd and 4th segments being attenuated and stretched out leech-like in walking; the 5th, 6th and 7th segments are tumid on the back, scarcely humped; the 8th, 9th and 10th segments rather tumid and very convex on the back; the 12th segment is humped, quadrate, and terminating in two sharp short distant points directed backward; between this and the 13th segment, is slightly concave, and the hind claspers are passed under the body in walking. Prevailing colour clear pale green, mixed with white-green on the back, and not varied with brown; the clear green forms an interrupted median stripe of shuttle-shaped markings down the back, one on each segment; also two broad oblique marks of the same green on each segment, distant in front, but approximate behind, and forming something like V-shaped markings pointing backward; a narrow white stripe along the middle

of each side on the 5th, 6th and 7th segments; this is connected by a very distinct white line with the white on the back. Feeds on Urtica dioica (stinging nettle), and is full fed in September, when it spins up amongst the leaves.—*Edward Newman.*

Description of the Larva of Abrostola triplasia.—Never rolls in a ring, but feigns death when disturbed, and falls to the ground, assuming somewhat the figure of a pot-hook or letter S. Attenuated in front, the 2nd, 3rd and 4th segments being elongated and stretched out leech-like in walking; the 5th and 6th segments are humped and elevated in walking; the claspers are ten in number, the anterior pair, those on the 7th segment, being generally held clear of the ground in walking; the 12th segment is humped, and the hump concave, culminating in two lateral points; the outline of the larva from this last hump descends perpendicularly to the anal pair of claspers, and these evidently pass under the body whenever moved forwards in walking. Prevailing colour olive-green or dingy brown, very variable; 2nd, 3rd and 4th segments deeper olive-brown, with a whitish central dorsal stripe, and generally also a short lateral stripe of the same pale hue; the 5th and 6th segments have each a dark velvety patch on the centre of the back, which I have already described as humped; on the 5th segment this patch is triangular, the apex of the triangle being anterior, and the triangle surrounded by a whitish margin; the patch on the 6th segment is rounded before and behind and there margined with white, but open and not distinctly margined on the sides; the 12th segment has a transversely oblong dark velvet patch, surrounded with a white line: on all the segments, from the 5th to the 12th inclusive, is a rather indistinct and narrow white stripe just above the spiracles, which are also white; above this lateral stripe is an oblique line of the same colour on each segment. Feeds on Urtica dioica (nettle), Humulus lupulinus (hop), and is full fed about the end of September, when it spins up amongst the leaves.—*Id.*

Capture of Calosoma sycophanta near Penzance. — On examining, some weeks since, a few drawers of British insects, collected in this neighbourhood by Mr. W. H. Vingoe, naturalist, I was surprised at beholding in one of them a splendid specimen of Calosoma sycophanta, which he assured me was captured by himself in a field near Penzance, about three years since, but the exact locality he had forgotten. — *W. H. Hayward; Penzance, November* 2, 1860.

Is Diachromus germanus an Indigenous Insect?—The recent capture of Diachromus germanus has raised the question, Has it any claim to rank as an indigenous insect? It will be readily admitted that the appearance of this insect having been hitherto confined to that part of the coast which borders the English Channel would appear to give some warranty for the adoption of such an opinion; but probably, if we place the state of the case briefly in its correct position, a little attentive consideration of the circumstances may be found to shake, if not destroy, such hasty conclusions. If the species is not truly a British one, in what way are we to account for its getting a footing here? Does it fly across the channel, or does it swim? There is certainly another means of transit, — does it avail itself of the shipping, and take a passage on board? This is certainly possible, and we may therefore expect it to land on any spot between the Land's End and the Port of London. Up to the present time it does not appear to have chosen many localities for such a purpose: Kingsbridge, Deal and Hastings are the only spots apparently which it has selected. If we reject the idea of its being conveyed by shipping, let us see what distance it must fly in order to reach the above localities. Kingsbridge, in Devon, is about one hundred miles from

the nearest point of the Continent; Deal is about twenty-five; and Hastings not less than forty-five miles: either of these distances, it will be allowed, is a tolerable long flight for little Diachromus. I have thus briefly stated the two most obvious means whereby it may be supposed possible that Diachromus may reach our shores; I will, in the next place, with equal brevity, state the circumstances under which the capture of the insect took place. The first capture was made on the 2nd of September; the second on the 3rd of the same month; for six or seven weeks previous the wind had been from the south, south-west, and occasionally it had veered slightly towards the north, but not once had it gone to the east—the only wind that would have assisted it in its flight had it crossed the Channel. On the day of its capture the wind changed to the north-west, the sun was bright and hot, which roused all insect-life from the chill which had so long kept them motionless; Staphylinidæ, Curculionidæ, Geodephaga, &c., took wing, and the strong breeze which blew from the north-west carried them over the town of Deal, and, in fact, scattered them along the whole line of the east coast; myriads were no doubt carried into the sea, and many a Diachromus probably perished in the Channel, or was lost on the fatal Goodwin Sands; the streets of Deal were literally sprinkled with insects; it was, in fact, impossible to walk without crushing them under foot; the whole were brought from the country by the north-west wind; Diachromus had therefore been carried into Deal from some locality situated at the back of the town of Deal. Had an east wind prevailed and a similar shower of insects appeared, doubtless many Continental rarities might have occurred. In my own opinion, taking all circumstances into consideration, Diachromus is undoubtedly a British insect, an indigenous species, and that it will be taken plentifully, like Drypta dentata and Polystichus fasciolatus, whenever its proper locality is once discovered.—*F. Smith*; 27, *Richmond Crescent, Islington.—Intelligencer.*

Capture of Velleius dilatatus in a Nest of Hornets.—I last night succeeded in capturing a nest of hornets, the first I ever had the chance of making an attack upon: I took the whole number prisoners, with the loss of three or four lives only,—I mean on the adversary's side, — I did not lose so many. In preparing to remove the nest a rather good-looking Staph, evidently "the worse for liquor" (chloroform), was observed staggering about among its legitimate "occupiers and owners," who were "too far gone" themselves either to assist or to molest him. I very soon had him "in custody" as one "drunk and incapable," and although I am not "well acquainted with the family," I think there is little doubt he will be found to answer to the name of Velleius dilatatus. I transplanted the colony during the night, and this morning the work of the nest is being carried on in a glazed box under my own eye. As the capture of a nest of hornets is not an every-day occurrence, I will, when time permits, detail the plan of attack I adopted in the present instance, when it will be seen that with proper and very simple precautions no danger whatever need be apprehended by the assailing party. — *S. Stone; Brighthampton, Witney, Oxfordshire, September* 8, 1860.—*Intelligencer.*

Capture of Dinarda dentata at Weybridge.—A few days ago I had the pleasure of receiving two living specimens of Dinarda dentata from Mr. Crotch, who has, I believe, taken it in some abundance: I do not know the species of ant in the nest of which they were found, but Mr. Reading has occasionally taken it in that of F. fusca. Yesterday I had the gratification of taking three examples of D. dentata from the nest of Formica sanguinea; probably this is the first time it has been discovered, in this country, in the nest of this species of ant. F. sanguinea is by no means rare at

and in the neighbourhood of Weybridge. As I only devoted about half an hour to searching I am inclined to think that the Dinarda is not uncommon in the nest of F. sanguinea. I have not been successful in my search after novelties in the nest of F. cunicularia, but as the ant is generally distributed, and not at all uncommon about London, I still hope to find some novelty in the nest of that species. For the instruction of those who have not studied the Formicidæ, and are not well acquainted with the species and their habits, I may add that F. sanguinea closely resembles the wood ant (*F. rufa*), but it mines its galleries in banks, and particularly at this period of the season swarms with slaves, the latter being individuals of the species F. fusca. —*F. Smith ; 27, Richmond Crescent, Islington, N.*—'*Intelligencer.*'

The Hexagonal Form of Bees' Cells. — The following fact may perhaps be accepted as a help to the elucidation of one of the greatest marvels presented to us in the Animal Kingdom. The wonderful instinct of bees in the formation of their honeycomb has long excited the admiration and astonishment of man. The regular hexagonal construction of their cells has been almost viewed as a reproof to the geometric capacities of our own species; and philosophers have devoted their lives to the exposition of its mysteries, "nor," in the words of Spence and Kirby, "have its mysteries ever been fathomed," and again, "the construction of the combs of a bee-hive is a miracle which overwhelms our faculties." So many theories have been advanced on this complex subject that it seems almost preposterous to attempt any further explanation, but that the original (or if I may so say) predisposing cause of this arrangement is pressure or extraneous force may be received as a plausible idea; thus Buffon and others have described these cells as originally cylindrical, but changed to hexagonal by the pressure of the bees at work upon them, a theory refuted by the authors above noticed. Now, allowing this view of compression to be partly true, and without subscribing wholly to the notion that it is the direct result of the insects at work, there is another explanation I venture to put forth for this phenomenon. May it not result from the natural adaptability of the material, under the force of gravitation, to form hexagons, or to speak more plainly, in obedience to a law, the walls of each cell adapt themselves to the conditions superimposed, apart from any predetermination or instinctive impulse on the part of their builders? This seems to me at least fairly entitled to consideration, and chiefly from the following apparently trivial circumstance: having lately opened a box containing two or three hundred pills, which had been sent from a chemist's some time previous, in a hard condition, I was surprised, after removing the upper layers, to find, on approaching the bottom of the box, for the most part regular hexagons, roughly, yet strikingly resembling the cells of a honeycomb, and in some cases, where the pressure was unequal, pentagons appeared to have been formed: here, thought I, is possibly an analogy to the formation of the cells, *i. e.* bee-hive, and though duly conscious of the comparative worthlessness of so slight a fact on which to build a theory, I have considered it worth communicating for the mature consideration of your numerous scientific readers.—*J. Hawkes ; Kent County Ophthalmic Hospital, Maidstone, October* 30, 1860.

Proceedings of Societies.

Entomological Society.

November 5, 1860.—J. W. Douglas, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—'Patent Office Reports: Agriculture,' for 1857, 1858, 1859; presented by the United States Government. 'Twelfth Annual Report of the Ohio State Board of Agriculture, with an Abstract of the Proceedings of the County Agricultural Societies to the General Assembly of Ohio: for the year 1857;' by the Board. 'Annual Report of the Board of Regents of the Smithsonian Institution, shewing the Operations, Expenditures and Condition of the Institution for the year 1858'; by the Institution. 'Proceedings of the Boston Society of Natural History,' Vol. vi., Sheets 23—28; Vol. vii., Sheets 1—9; by the Society. 'Bibliographia librorum Entomologicorum in America Boreali Editorum;' by the Author, W. Sharswood. 'Sitzungsberichte der Konigl bayer Akademie du Wissenschaften zu München,' 1860, Heft 1 and 2; by the Academy. 'The Zoologist' for November; by the Editor. 'Journal of the Society of Arts' for October; by the Editor. 'The Farm and the Garden,' Vol. ii. Nos. 19—21; by C. A. Wilson, Esq. 'The Athenæum' for October; by the Editor. 'De la Chasse des Hymenoptères;' by the Author, Dr. Sichel. 'The Journal of Entomology,' No. 2; by the Proprietors. Four specimens of Heliophobus hispidus; by F. Bond, Esq.

Exhibitions.

The President exhibited Mycetoporus angularis, *Rey and Mulsant*, a species not hitherto announced as British, which he had taken in the mud on the coast near Shoreham, Sussex, on the 7th ult.: he observed that the above authors described the sixth segment of the abdomen in this insect as testaceous-brown, which did not agree with his examples; the insect had been previously taken by Dr. Power and Mr. Waterhouse.

Dr. Power sent for exhibition the following British Coleoptera, with the accompanying remarks:—

Mycetoporus angularis, Rey and Muls. Cambridge, 1833. I have seen many other specimens in possession of Messrs. Waterhouse, Douglas, Brewer, &c.

Quedius infuscatus, Erich. Sent to me by Mr. Crotch for determination. Said to be found about nests of Formica fusca.

Ammœcius brevis, Erich. Taken by Mr. Hayward on the sands at Southport. These three insects, I believe, have not hitherto been announced as British.

Sphindus Gyllenhalli, Chev. Taken by C. Turner, in a fungus in the New Forest. This insect is figured by Spry and Shuckard, and described as found in Sherwood Forest, but does not occur in Stephens or any of our Catalogues; neither have I seen any British specimens except this.

Rhizophagus nitidulus, Erich. Scotland. Distinguished from R. dispar, which I have placed below it for comparison, by its larger size, cylindrical and convex form, the red band at base of the elytra, and especially by the last segment of the abdomen being deeply impressed beneath.

Læmophlæus bimaculatus, Payk. New Forest, August, 1860.

Oxylænus variolosus, Duf. Taken by myself from rotten fungus grown on a stump at Holme Bush, May, 1860.

Hetærius sesquicornis. Interesting as taken by myself from a new locality (Weybridge), in the autumn (October, 1860), and from nests of F. rufa, instead of those of F. fusca, as at the only other known locality, Hampstead.

Leptinus testaceus. Near London, October, 1860.

Batrisus venustus. Near Croydon, under bark, October, 1860.

Mycetoporus punctus, Erich. Near London, October, 1860.

Philonthus splendidulus, Erich. Scotland, 1860. Possibly sometimes confounded with P. aterrimus, but easily distinguished by having only five thoracic punctures and pale antennæ.

Platyderus dissectus. Taken by the Rev. A. H. Matthews near Nottingham.

Mr. M'Lachlan sent for exhibition a specimen of a new British species of Phryganidæ (Limnophilus borealis of Zetterstedt), identified from a specimen in the foreign collection in the British Museum, from Dr. Hagen; also an example of Agrypnia Pagetana (*Curtis*), taken originally near Yarmouth, and of which very few British specimens are known. Both of these species were taken by Mr. Winter in the Ranworth Fens.

Mr. John Scott exhibited the following Coleoptera, recently captured by himself:—

Leptinus testaceus. Taken in the London district.

Mycetoporus punctus. Ditto.

Philonthus splendidulus. Under bark of oak, at Abergavenny.

Omosita depressa. Under bark, at Crwmlyn.

Mr. Stevens exhibited some splendid Coleoptera, lately received from M. Mouhot, captured by him in Cambodia; amongst them may be mentioned both sexes of Baladeva Walkeri, first described and figured in the 'Transactions' of the Society, and the female hitherto unknown; a magnificent new Buprestis, equal in size to the largest known species of the family; and a splendid smaller species, also new, and both unique. Mr. Stevens also called attention to some fine new Longicorns and Anthribidæ in the collection.

Mr. Janson exhibited the following Coleoptera, not previously recorded as natives of Britain, *viz.* Bradycellus harpalinus, *Dej.*, Mycetoporus angularis, *Muls.*, and Hylastes cunicularius (*Knoch.*), *Eric.*

Mr. Janson also exhibited the nest of an Hymenopterous insect, apparently a species of Pelopæus, which had been found inside a grand piano-forte sent home from Ceylon to Messrs. Collard & Co., for repairs.

Mr. Waterhouse read a paper intituled "Notes on Chrysomelidæ in the Linnean and Banksian Collections."

Mr. Walker read "Characters of undescribed Lepidoptera in the Collection of W. Wilson Saunders, Esq."

Part vii. of the current volume of the Society's 'Transactions' was on the table.—*E. S.*

The Sea Anemones of Dawlish, Devon.—Seeing by your last most interesting and valuable work on Sea Anemones that you particularize different localities in which species are found, I venture to trespass on your valuable time by describing the varieties which I — although a tyro indeed — have found at Dawlish. Small orange, drab, and flesh-coloured Actinoloba Dianthus, with disks, when expanded, varying in circumference from a silver penny-piece to a shilling or even half-a crown, are common enough. And here and there, mostly in the company of the Plumose, I find Sagartia viduata, with the disk averaging three-quarters of an inch in diameter, and column, principally at night, extended to nearly two inches. Within three hundred yards of the shore at the Horse Rock point, on a low shelving mass of conglomerate rock, I have lately come upon a complete colony of the white, and a variety, translucent neutral-tinted white Dianthus, with disks as large as represented in figure 1, plate 1 of your book. May I describe to you here also the peculiarity of one of the large sized Actinoloba which I found? Unfortunately, after a month's healthy existence it died, ere I had seen your book, or I should have ventured to send it to you: a young Dianthus was attached to its column about a quarter of an inch from the base, with a disk at least half an inch in diameter. I noticed that if I touched the tentacles of the largest flower, both felt the shock and contracted; or if I fed the small one, the larger Dianthus began to draw in its tentacles and close up, and I saw the food moving up and down, as if in a liquid state, in the large column. Then again, if I fed the mother Dianthus, the tiny one contracted, and would expand with the same translucency afterwards, as the Dianthus usually does on being fed. There was no ridge or contraction that would warrant the separation afterwards of the two animals, the column of the smaller Dianthus seeming merely a bulging out of one side of the larger one. Brown or chocolate-coloured Sagartia bellis, with vermilion-streaked disks, and columns shading from flesh-colour to pinky violet where the suckers commence, I also found in great quantities on the same rocks: also S. Troglodytes, such as described at plate 2, figure 5 of your work; and I have no doubt that there are many other species of Anemones in the same place, but the tide flows so rapidly at this particular point that I have as yet but half explored its hanging rocks. Having once or twice, when in search of sea-weeds and Lucernaria, come upon a solitary floating Sagartia sphyrodeta on rocks uncovered at ordinary low tides, I felt persuaded that there must be a colony of them somewhere near, and soon I found them. On a stretch of perpendicular mud-covered rock, close to the Horse Rock point, I counted a hundred and seventy in one space, not averaging more than a yard in width and height, and since then I have found another numerous colony of the white-disked Sphyrodeta. Should you like to see any of the varieties which I have mentioned, I shall be very happy to send them to you, as I have had Sagartia sphyrodeta and viduata, as well as all sized Plumose Anemones, in perfect health, for six months. Last month Lucernariæ were to be found here in such quantities that one could scarcely take up a piece of Ulva without finding two or three. I kept two alive for a week without feeding, as I noticed that after one of their voracious meals the animal immediately grew drowsy,— if the word can be used — flaccid, and by next day it loosened its hold on the Ulva and was dead. — *Selina Hume Macleod*; 24, *The Strand, Dawlish, September* 24, 1860. (*Communicated by P. H. Gosse, Esq., F.R.S.*)

Physalia pelagica at Torquay.—My neighbour, Lieutenant Hughes, R.N., has just showed me a specimen of the Portuguese man-of-war (*Physalia pelagica*), so familiar to all who traverse the warmer regions of the Atlantic. The bladder is about five

inches in length, brilliantly stained with Antwerp blue, merging into the general colourless translucency. The crest or "sail," is collapsed, and is only slightly tinged with pink, and the long pendent cord-like appendages (tentacles, &c.) are reduced, probably by the action of the waves on the shore, to their mere bases. Mr. Hughes found the specimen the day before yesterday, washed up on the beach at Babbicombe. It was alive, but not in vigour, for he lifted it and brought it home in his hand with impunity, not having the fear of Mr. G. Bennett's experience before his eyes; nevertheless, when put into an aquarium, it gave tokens of life for many hours, by forcible contractions at intervals. The species has been found on our western shores before, but its occurrence is sufficiently rare to be put among the *notabilia* of the 'Zoologist.' —*P. H. Gosse; Sandhurst, Torquay, October* 31, 1860.

Correction of an Error in the Food-plants of the Larva of Notodonta dictæa.— Mr. Newman (Zool. 7257), on the authority of Mr. Huckett, gives Betula alba as one of the food-plants of the larva of Notodonta dictæa. This assertion has been previously made by various collectors, and this tree is included in the list of food-plants in several entomological works. I cannot, however, help thinking that there is some mistake. I have been in the habit of taking this larva ever since I was a little boy, but always on some species of poplar or sallow. Many and many a birch tree have I thrashed and examined, and though on them I have found eggs and larvæ of N. camelina, N. dictæoides and N. dromedarus, never at any time or by any chance have I seen the slightest trace of N. dictæa, nor have I ever met or heard of an entomologist at home or abroad who had done so. It is quite unnecessary for me to say that it is the farthest from my wish to cast any doubts on the accuracy or veracity of my brother-knights of the net Messrs. Newman and Huckett, but I do ask them to tell us in the pages of the 'Zoologist,' whether they have ever found or fed a larva of N. dictæa on birch, or whether they make the assertion upon hearsay? and I make the same request of all the readers of the 'Zoologist' in all parts of the world. It is no use perpetuating an error. Some of the older entomological authors were very careless and inaccurate in their lists of the food-plants of Lepidoptera, and it has been far too common a custom for succeeding writers to copy their assertions without proving by their own practical and optical experience whether they were correct. —*H. Harpur Crewe; Drayton-Beauchamp Rectory, near Tring, November* 12, 1860.

[I am really obliged for the correction of this very manifest error, and have no hesitation whatever in acknowledging it to be so. Thinking it important that the same volume that contains the error should also contain the correction, I have thought it desirable to insert Mr. Crewe's letter *here*, although rather out of the usual course. The error is not a copied one: and I may here state, once for all, that every part of my descriptions are made without reference to any prior description, unless such fact is explicitly stated. For every error detected by my readers I alone am responsible, and shall feel grateful for all corrections.—*Edward Newman.*]

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