THE ZOOLOGIST FOR 1858.

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THE ZOOLOGIST:

A

POPULAR MISCELLANY

OF

NATURAL HISTORY.

CONDUCTED BY

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

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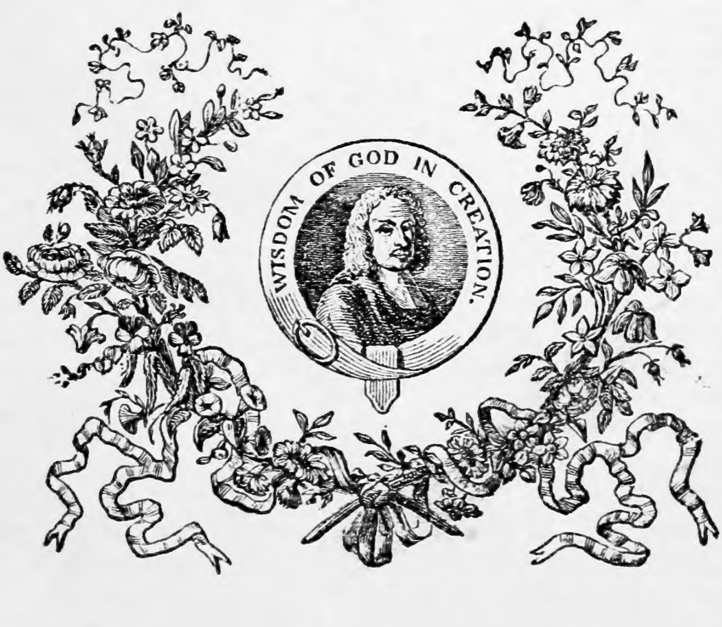

LONDON:

JOHN VAN VOORST, PATERNOSTER ROW.

M.DCCC.LVIII.

Oh, attend, whoever thou art,
Whose candid bosom the refining love
Of Nature warms; oh! listen to my song;
And I will guide thee to her favorite walks,
And teach thy solitude her voice to hear,
And point her loveliest features to thy view.

FLETCHER.

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FOR 1858.

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By the Rev. Philip H. Newnham, M.A.

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It is not easy satisfactorily to trace the origin of the word *fox*. Richardson ascribes it to the Gothic verb *foxa*, to deceive; but it is far more probable, from the analogy of similar instances, that the verb has its origin in the name of the animal. Talbot refers *fox* to the old English word *fax*, hair (whence the name of Fairfax), as if the creature were named from its long bushy tail. It is, at all events, identical with the German *fuchs*, and this latter word strongly reminds us of the Latin adjective *fuscus*, which properly denotes a reddish brown colour; but I would not venture to affirm that this resemblance is anything more than accidental. *Vixen* is only a feminine form of *fox*, and was originally written *fixen*, or, more anciently, *foxin*. It appears from an early period to have been applied to quarrelsome snarling people, irrespective of sex; and, however the ladies may rebut the charge, one cannot help remarking the significant fact that language and custom have now made this word the monopoly of the fairer sex. In Scotland the fox is known as the *tod*. This word in Gaelic means a clod, or bush, or a quantity of wool, and we ourselves use it to denote a measure in Wool weight. As applied to the fox, it seems to refer to his bushy tail, and this analogy supports the conjecture of Talbot which has been already alluded to.

Cat in Latin is *catus;* French, *chat;* Greek, γάτος; Turkish, *keti;* Arabic, *kitta;* but I am quite unable to deduce the meaning of the name. *Kitten*, of course, is only a diminutive form. The familiar

title of *puss* seems to be the same as the Latin *pusa*, or *pusilla*, tiny, a name of endearment originally applied to a little child, and thus transferred generally to any pet, especially to the cat, and, from the similarity of its long soft fur, to the hare. Talbot's conjecture as to the origin of *puss* is no less amusing than it is curious and far-fetched. Finding that it is applied to both the cat and the hare, he argues that the Latin *lepus* (hare) may have been corrupted in French into "le puss," and that we have borrowed our word from this. But in Welsh the hare is called *cáth eithen*, *i. e.* furze or gorse *cat*. Little children call their warm neck-comforters by the name of "pussies," and the soft "catkins" of the willow and sallow take their name from the same source, so that I have little doubt that the origin I have suggested for *puss* is the correct one. *Grimalkin*, a name which is sometimes given to the cat, is compounded of *grey* (French, *gris*) and *Malkin*, a diminutive form of "Moll," and is one of the many cases in which a Christian name has been applied to some familiar animal.

Walrus is the Norwegian *hvalros*, *i. e.* whale-horse. Another Norwegian name for the animal is *rosmar*, which is similarly compounded of *ros*, horse, and *mor*, the sea.

The *whale*, in the Scandinavian dialects, is called *hval* or *hvalo*. In Greek it is φάλη and φαλαῖνα; in Latin, *balæna*. All these are identical with our word, and are modifications of the same root as appears in our verb to *wallow*, and which we ultimately trace to the Hebrew *pâlal*, to roll. Old Isaac Walton tells us that Pliny "speaks of the fish called the Balæna, or whirlpool;" and assuredly the unwieldy wallowing of these monsters of the deep would naturally suggest their distinctive appellation.

Dolphin is the Greek δελφὶς, a name which was in all probability originally applied to our *porpoise;* and, when we consider the origin and affinities of this latter word, we can hardly think the resemblance between δελφὶς and δέλφαξ (a pig) to be a purely accidental one.

Porpoise is corrupted from the French *porcpoisson*, hog-fish. Similarly it is called *marsouin*, and in German *meerschwein*, *i. e.* sea-swine, and in the Breton dialect *morhuc*, or sea-hog; showing that the resemblance of its general contour to the back of a pig is generally appreciated.

In Mr. Bell's 'British Quadrupeds' we read "Grampus, says the Rev. Mr. Barclay, is the Saxon *hranfisk*, which signifies grunting fish. I cannot, however, help thinking that the more obvious and probable etymology is the French *grand poisson*, great fish." There is an objection to this latter suggestion, namely, that it does appear,

from Mr. Barclay's remark, that *hranfisk* is a name which actually is applied to the grampus, whereas I am not aware that the French ever use "grand poisson" to designate that animal; and, in endeavouring to etymologise, we cannot confine ourselves too close to facts as they are, or too carefully avoid theorizing on what simply might be.

I again copy from the 'British Quadrupeds' the remarks upon the name of the *caaing whale.* "These whales follow their leader with blind confidence, and hence their pursuers endeavour to guide the leader on shore, as they are then morally sure of the whole herd. Caaing is a Zetland name, generally considered by authors as indicating *calling, i.e. leading* whale. But Mr. Barclay assures me that the real meaning of the word is 'driving.'"

Beluga is a Russian word, and is said by Webster to signify *white fish.*

Rorqual is compounded of *hval* or *waale*, and *rohr*, signifying whale *with folds*, in allusion to the series of longitudinal folds beneath the throat of the animal.

Horse is the Icelandic *hross, ross;* Sueth., *hors, horsa, ors;* French, *roussin.* These words are of kindred origin with the German *reiten*, and our *ride, road*, &c. We may also compare the Latin word *rheda*, a chariot; and thus Etymology alone would teach us how very ancient is the use of the horse as subservient to man. The name *mare*, too, reveals to us some very curious and interesting facts. Although it is now restricted to the female horse, yet it is no doubt identical with the Celtic *march*, which simply implied a war-horse, without restriction as to sex. We trace this same root in many other words: thus, *marshal* (French, *maréchal*) meant originally the commander of an army; *march* was strictly the route of an army; the "marches" were the boundaries of two countries, which used to be the perpetual scenes of border warfare, and, hence, *marquis* (Lat. *marchio*) was a name given to those barons who lived near the boundaries, and whose especial duty it was to keep off marauders. All these words are to be referred to one parent stock, which we see in the Latin *Mars*, the god of war, *mors*, death, and in the first syllable of our own *murder.* Surely we can need no stronger testimony than is afforded by these etymological facts to the *martial* spirit of our Teutonic forefathers, and to the well-known efficacy of their cavalry and terrible scythe-armed war-chariots.

A *steed* is properly a *stud* horse. *Colt* appears to be etymologically identical with the word *child*, both of them being merely general terms for offspring. *Foal* and *filly* are the same as the Latin *pullus*,

young, and the Greek πῶλος, a foal. It is curious that we have exactly preserved the Greek form in the word tad*pole*, *i.e.* a young toad. *Pony* is doubtless, as Johnson derives it, a small or *puny* horse. The *barb* reminds us, by its name, of Barbary, the country from whence it was first introduced.

The etymology of *cob* is worth the trouble of unravelling. A cob is a strong thickset sort of horse, and the adjective "cobby" is still used, in the dialect of some parts of Yorkshire, as an equivalent for stout. In *cob*loaf, *cob*nut, and a host of similar compounds, the idea is evidently that of size. Our word *gaby* (the Italian *gabbiano*) is again of the same root, and the signification of these words, which mean what we should call a "thick-skull" or "blockhead," all lead us up to the original source, which lies in the German *kopf;* Latin, *caput;* Sanscrit, *kepala;* all signifying *head.* In like manner the name of the *chub* is derived from its large head, and the root ramifies into a thousand directions, and reappears in a hundred words where you would least suspect it, but in every case it is intimately connected with one or other of its three leading ideas, which seem to be size, strength, and stupidity.

A *dray* horse no doubt takes its name from the verb to *draw*, as being specially adapted for the draught of heavy burdens. In *hackney*, and its contracted form *hack*, we are again led back a long way: through the French *haquenée* we can trace it to the Italian *acchinea*, which is a diminutive form from the Latin *equus* (horse); and the identity of this with the Greek forms ἵκκος and ἵππος, Sanscrit *açvas* (horse) and *ibhas* (elephant), both of which come from a root signifying to carry, may be satisfactorily established by a number of intermediate modifications. From the same source we have *hobby*; Dutch, *hoppe;* which is almost the same word as the Greek ἵππη, a mare. *Hobby*, as the name of the hawks so called, is one of those curious instances in which two words appear to be similar, while they have, in reality, nothing whatever in common. *Nag* is the German *nake*, from the Anglo-Saxon *hnægan*, our modern *neigh*, a word which is an imitation of the sound which it characterizes. *Palfrey* is a word borrowed from our Norman ancestors, and carries us back to the old days of falconry and chivalry: in French it is *palefroy;* in Italian, *palafreno;* and is clearly derived from *par le frein*, signifying a ladies' horse, *i.e.* one led *by the rein*, at the hands of the attendant page or knight. In the word *roan* it is possible that we may have another instance of what I have before alluded to under the name of a "pregnant" etymology; for although the reference to the colour of

the "red-roan steed" is abundantly sufficient to account for the name, yet it is very possible, as Mr. Talbot suggests, that it may have originally had reference to the celebrated breed of *Rouen* horses. In like manner *Sheltie* will preserve a geographical fact which may become curious in some future generation, should this breed ever become extinct in its original birth-place, the Shetland Isles.

Ass is the Latin *asinus;* French, *âne*, which is corrupted from *asne*. The root seems to be identical with that of *ear*, which is the Gothic *auso;* Greek, οὖς, and, in the Laconian dialect, ἄυς; Hebrew, *ôzen*. There is a common word connected with this root, which would be the very last in which we should be likely to suspect any reference to an animal: a painter's *easel* is the German *esel* (ass), which is identical with the Latin *asellus*, a diminutive form of *asinus*. We ourselves speak of a clothes'-horse, &c., and so the Germans also use *bock* (buck), and the Greeks ὄνος (ass), while the Greek word for easel is κιλλίβας, which is compounded of κίλλος, an old word for *ass*. In Greek we find the verb ὀγκάομαι, to bray. Comparing this with our *donkey*, it seems probable that both words originate from the same idea, *viz.* imitation of the animal's voice.

Mule is the Latin *mulus;* French, *mulet;* and may be connected with *molior*, I labour; in Greek with μῶλος, labour, and μολεῖν, to go; in our own language with the old word *moil*, and, indeed, the primitive orthography of the word was *moyle* or *moil*. In the Cornish dialect this latter word signifies *barren*, and, to say the least of it, this is a very remarkable coincidence, and it is quite possible that our word may partake of the double parentage; although it is equally possible that the stubborn *mulishness* of the animal, coupled with its sterility, may have suggested the name for a hard and barren soil.

Pig is the Danish *bigghe, vigghe*. These two forms strongly remind us of the nursery name, "piggy-wiggy," and suggest the idea that the name of pig is derived from its squeaking cries, just as hog and sow are taken from its more sonorous grunting. This idea is confirmed by the words which Shakespeare puts into Aaron's mouth, when he murders the nurse:

> "Weke! weke!—So cries a pig prepared for the spit."
>
> *Titus Andronicus*, Act iv. Scene 2.

The pig is still the especial food of our labouring poor, and, as many writers have remarked, a study of words shows this to have been the case for centuries past. The animals which supply our food, so long as they are alive, are known by their old Saxon names, as *ox*, *calf*,

sheep, &c.; but, as soon as they are dead, their flesh receives a Norman name, such as *beef* (*bœuf*), *veal* (*veau*), *mutton* (*mouton*). So, too, with our present animal, the fresh *pork* and the dainty *brawn* were for the tables of the Norman lords of the soil; but the Saxon churl was allowed to feast on his own *bacon*. This word is variously derived. Johnson takes it as though it were *baken*, *i.e.* dried meat. Webster refers it to the German *bache*, a wild sow. But in a curious old book, printed in 1605, and intituled 'A Restitution of decayed Intelligence in Antiquities,' we find the following explanation of this term: "But whereas swyne's flesh is now called by the name of bacon, it grew only at the first unto such as were fatted with Bucon, or Beech-mast."

We can trace the word *hog*, in some modification or other, through all the cognate languages, and it is, as has been already remarked, imitative of a pig's grunt,—a sound which may be fairly represented as "ugh." In Welsh *hog* is *hwc;* in Persian and Zend it is *chuk*, a form which reappears in the old English *chuck*, and is still retained in the name of the American wood*chuck*. In French this form gives us *cochon*. The Greek word ὖς is an intermediate form, and supplies us with the link which binds together the apparently dissimilar words *hog* and *sow;* for our words *sow* and its plural *swine* are manifestly the same as the German *sau;* Latin, *sus;* Greek, σῦς. This last is usually derived by lexicographers from σεύω, to rush, in allusion to the fierceness of the wild boar; but, when we remember how commonly the aspirate in Greek is merged into a sibilant, we can hardly help considering ὖς and σῦς to be only different forms of the same word. This view, too, is confirmed by the call to pigs which we can hear in any farm-yard, "Sus! Sus! Sus!" And this is a good example of an Etymology which is undoubtedly sound, although, at the first glimpse of it, it seems to be the very contrary.

Boar is the Anglo-Saxon *bar;* Dutch, *beer*. It forms the last syllable of the German *eber* and Latin *aper*, and appears again in the Latin *verres* and Sanscrit *varaha*. All these words spring from a kindred root, which is always connected with the idea of roughness. We find it in the Latin *barba* and in our own *beard* and *bristle*, and the word *boar* no doubt refers to the bristly back of the animal.

Deer affords us an instance of a word which was originally used in a very wide sense, but has been gradually restricted to one particular animal. The Anglo-Saxon *deor*, German *thier*, are the same as the Greek θήρ, a name of wild animals in general; but the stag, as the noblest of the beasts of chase, has monopolized the title of *the* beast,

par excellence. The Greek θὴρ leads us, through its dialectic variation φὴρ, to the Latin *fera*, by which, and the French *fier*, we arrive at our *fierce*. *Buck* is from *bocker*, to strike, and when we compare with it the French *bouc*, a he-goat, we shall readily arrive at the conclusion that it was a general title, applied to the males of horned animals, and more lately extended to others, such as the rabbit, &c. Still the stag preserves the same pre-eminence which we have seen to be indicated by the name of deer, for "a buck" is, again *par excellence*, understood to refer to the stag alone; while, if we apply the name to other animals, we always specify the kind. A further instance of this is found in the name we give its flesh, *venison*. This name was originally given to the flesh of all beasts killed in hunting, as we see by its derivation from the French *vener*, to hunt; but it was soon restricted to the flesh of the royal beast of chase alone.

Doe is the Anglo-Saxon *da;* Dutch, *deyn;* French, *daim;* Latin, *dama*. Richardson derives it from the Greek δεῖμα, timidity; but this is one of those mere guesses which always excite suspicion. May it not be a kindred form with δάμαλις, a heifer, and δάμαλος, a calf? These words come from δαμάω, which is identical in meaning and etymology with our *tame*. *Doe*, like buck, may have originally been a sort of generic term, referring to the gentleness and tameness of the female animals as compared with the males.

Hart is the Anglo-Saxon *heord;* German, *hart*. It is the same word as *hard*, and is meant to imply strength, an idea which we trace very strongly developed in the kindred words in Greek. *Hind* is akin to the Latin *hinnus*, a mare; Greek, ἵννος, a filly. The Latin *hinnio*, to neigh, and our own word *whinny*, show us that these names are imitative of the voice of the animal; and it seems probable that the low quiet cry of the doe has caused the name to be transferred to her. In all probability *fawn* is another word from whence we may infer the high estimation in which the stag was held in the old days of the chase. It is the French *faon*, *fan*, which is contracted from the Latin *infans*, a word which signifies "speechless," and is, properly, only applicable to human infants.

Skinner suggests that the origin of the name *stag* is to be found in the Saxon *stigan*, our *stick*, in allusion to its sharp antlers, an etymology which requires confirmation from the analogous term *buck*. Junius, with his usual mere punning guess, takes stag from στείχειν, to go in order. Tooke believes it to be akin to the word *stage*, and to allude to the lofty bearing and erect head of the animal

Fallow is an adjective, describing the general colour of the deer to

which it is applied, the Anglo-Saxon *fealewe* being akin to the Latin *helvus*, *gilvus*, and to our own *yellow*. It is most curious to trace this word through the almost endless ramifications of its root, which, as I believe, may be ultimately carried back to the Anglo-Saxon *gyl*, and to *heol*, a name of the sun in some old Teutonic dialects. These affinities are most admirably worked out by Mr. Talbot in his 'English Etymologies,' but, as is too often the case, his observations are most painfully in need of some connecting thread.

Roebuck presents us with an ample scope for speculation as to whether the first syllable of its name be the Celtic *roe*, red (as the *roe* of fish is named from its colour), or whether it be not the Anglo-Saxon *ræge*, *raage* (for *hræge*), signifying a goat, and akin to the Greek τράγος. Possibly it may partake of both relationships: certainly its scientific name, *Cervus capreolus*, inclines us to be in favour of the latter etymology. In French *chevre* is a goat, but *chevrette* is a doe; *chevreuil* is a roebuck, but *chevrotine* is deer-shot. This confusion has partly arisen from a certain resemblance between *cerf* (Latin, *cervus*), a stag, and *chevre* (Latin, *caper*); and the gradual progress of form from animals of the goat tribe to those of the deer has in all probability tended still further to complicate this etymology.

Were I to endeavour to trace the various and most dissimilar modifications of the root which appears in our word *goat*, I should infallibly, though, as I believe, unreasonably, be accused of romance by the general reader. It is the Anglo-Saxon, *gœt*, *gat;* but in German the *t* becomes *s*, and the word appears as *geis*, and also in the still harder form *gems*. It is the Gothic *gaitei*, *gaitsa*, and this latter form reminds us of the Sanscrit *adsha*, which, be it remembered, was pronounced with a strong guttural *g* before the first vowel. Through various other forms we trace it to the Hebrew *gâz*, which is referred by Gesenius to the root *gâzaz*, to be strong. We must, therefore, reject Junius's guess, that it is derived from χαίτη, hair, as well as Wachter's more reasonable conjecture that it comes from the Saxon *gytsean*, to be lustful. *Kid*—the Turkish *getsi* and Hebrew *gedi*—belongs also to the same family as *goat*.

It may not be out of place to notice here some of our own words which are derived from the names of the goat. To *caper* is precisely the same word as the Latin for a goat; and hence, too, comes *caprice*, *i. e.* a whim as sudden and unlooked for as are the bounds and vagaries of a kid. Who, again, would have thought that there could be any connexion between the name of the London "cab" and that of our animal? But it is quite certain that *cab* is an abbreviation of the

French *cabriolet*, a word derived from *cabri* (caper), a kid, and employed to designate a light easy-going kind of vehicle, which was able to traverse roads along which the original heavy and lumbering chariots were unable to venture.

Sheep is the German *schaf*. This word is referred by Richardson to *schaffen*, in the sense of to drive, the allusion being to the driving of sheep before the shepherd, just as one of the Greek words for sheep — πρόβατον — may be derived from προβαίνειν, to go before. It may be that the *schäfer*, or shepherd, was so called from the *schaft*, *i.e.* stick (our "shaft") with which he drove his flock, and that thus his name may have grown to be applied to the objects of his care; or, possibly, the etymology may embrace both these ideas.

Richardson derives *ram* from the Anglo-Saxon *hremman*, to *butt*, or to *ram*, as we say; but, as we have already remarked, it is not probable that any such verb will be derived from the habit of the animal, but rather *vice versâ*. Family resemblance leads us in quite another direction. *Ram* is very nearly the same word as its Greek equivalent ῥὴν, which is probably only another form of ἄῤῥην, male; and this may be traced to an old root signifying strength. So, too, *tup* is taken from a root which is now little used by us, but which is found in the Greek τύπτειν, to strike. *Wether*, or *wedder*, is similarly referred by Richardson to the Anglo-Saxon *witheran*, to resist.

In the word *ewe* I think we may trace a very interesting story. It is the same word as the Latin *ovis* and the Greek ὄϊς, which are, *possibly*, imitative of the low inward bleat of the sheep, which is a very distinct sound from its well-known "baa." There are many old words wherefrom we may gather the fact that the wealth of our primitive forefathers lay in their cattle. Such words are the Hebrew *mik' neh*, which signifies both cattle and wealth or riches; the Greek κτῆνος, cattle, as compared with κτῆμα, a possession; and the Latin *pecus*, cattle, as compared with *pecunia*, money. I believe that our present word indicates a similar state of things; for although *ovis* is a sheep, yet *opilio* is a shepherd; and this latter word seems, at all events, to be connected with *ops*, *opes*, riches.

Lamb is the Danish *lam*; German, *lamm*. In Welsh *llanu* is to bound, and is nearly akin to *leap*, and other words of the same family. I suspect, therefore, that the lamb is so called from its frolicsome gambols.

We may here refer to a fact which is but little known. The breed of sheep from whence we obtain the *merino* wool was originally derived from our own country. Stow and Baker tell us that in the year

1404, Edward IV. "gave a license to pass over certain Cotteswolde sheepe into Spain." These were the origin of the present merinoes, a name which is a slight corruption of the Spanish *marino*, and refers to the original importation of the breed from "beyond the sea."

Ox is the Anglo-Saxon *oxa;* Danish, *oxe;* Gothic, *aulis.* The root will be found in the Icelandic *aka;* Sueth., *acka*, to draw, which is the same verb as is found in the Latin as *ago*, and in Greek as ἄγω. The connexion existing between these words points out to us the primitive use of oxen for the yoke; while the horse, as we have seen that its names imply, was used for riding, or for war, but not for agricultural purposes.

Bull is identical with its Latin equivalent *bos;* Greek, βοῦς; French, *bœuf;* words which are all formed from the root *bo*, imitative of the loud bellowing of the animal. So, too, *cow*—which in the Teutonic languages appears as *ko* or *kuh;* Persian, *gau*, *kau;* Malabar, *ko;* Sanscrit, *gou*, *ghau*—is also a name imitative of the voice; and it is curious that in Greek we have both the verbs βοάω and γοάω, expressive of a loud and deep sound. Richardson suggests that *cow* is derived from the Anglo-Saxon *ceowan*, to chew, from its habit of chewing the cud; but this very plausible conjecture is found to be unsupported by the analogy of other languages. Professor Donaldson has some interesting remarks upon the curious coincidence to be remarked, throughout the Indo-Germanic languages, between the words which express the idea of *land* and the names of the cattle which till it. Thus, in Sanscrit, *gaus* means both *cow* and the earth; and in this latter sense we find the root in the Greek γῆ, γαῖα, and the German *gau*, country. The same analogy may be traced, though not quite so evidently, in the words related to *bull. Kine* is the plural of *cow*, just as *swine* is the plural of *sow.*

In *calf* we have another instance of a word which was originally used as a general term, but which has been gradually restricted to an individual case, although, indeed, we still speak of a hind's *calf*, or of an elephant's *calf.* Our word is the Anglo-Saxon *cealf;* Swedish, *kalf;* Danish, *calv;* German, *kalb;* and it is akin to the Dutch verb *kalben*, to vomit, which comes from a root indicative of gaping, having its nearest English analogues in *yawn* and *yean.* Calf, therefore, properly means any offspring. Webster ingeniously accounts for the use of this word to indicate part of the leg. A calf is, properly, as we have said, any offspring: hence it comes to mean an offshoot or protuberance, and so has been applied to the protuberant part of the leg. In the old expression, "calves of the lips," it is hard to say whether

the reference be to the *protruding* of the lips, or, adhering to the strict meaning of the word, to the *open mouth*.

I cannot satisfactorily account for the first syllable of *heifer*. The second syllable is, no doubt, identical with the Anglo-Saxon *fear;* German, *farfe;* Greek, πόρτις; all of which words refer to the same animal. In Hebrew, too, we find *par*, a bull, and *pârah*, a heifer, words which preserve the analogy of ox, and are formed from the same root as has given us our verb to *bear*.

I again quote from Mr. Bell: "When a cow produces two calves, one a male, and the other a female, the latter is styled a *free martin*, which, it is said, never breeds. In Scotland a cow or ox which is fattened is called a *mart*. Hence, probably, our term originated; for the female, being unfit for breeding, was *free*, or at liberty, to be fattened for the *mart*, or market."

The breed of *Kyloe* oxen are said to derive their name from the Scotch islanders having to drive their beasts across the "kyles," or ferries, on their way to market.

Neat cattle in Anglo-Saxon are called *neat*, *neten;* in Swedish, *nöt;* in Danish, *nöd*. The Anglo-Saxon *geneat*, herdsman, is also akin. The root will be found in the Welsh *cnud*, a group, and kindred words are the Latin *nodus*, our *knot*, *knead*, and *need*, in all which words the common idea is that of pressure. *Neat*, therefore, is a generic name for *herded* cattle.

The first letter of *steer* is merely euphonious, and forms no part of the root. The word is identical with the Latin *taurus;* French, *taureau;* Arabic, *thawr;* Chaldee, *tora*. In Hebrew the initial *t* becomes *sh*, and the word appears as *shor*. It comes from a root signifying strength, which we trace in the Latin *torus*, muscle. *Beeves*, it need hardly be said, comes from the French *bœuf*, which also supplies us with our word *beef*.

Cattle is said to be a general term, corrupted from the Latin *capitalia*, *i. e.* the personal property of any individual. We find the same word in the legal term "goods and *chattels*."

Squirrel has a pretty origin. It comes to us through the Latin *sciuriolus*, a diminutive of *sciurus*, which is the Latinized form of its original Greek name, σκίουρος, a compound of two words signifying "shadow-tail."

The first syllable of *dormouse* no doubt refers to its sleepy propensities, and is of a root which appears in the Latin *dormio*, Greek δαρθάνω, to sleep, and also, as I believe, in our *dr*eam. The second syllable of our word is, now, at all events, simply *mouse*. But as

hermaphrodite etymologies—by which we mean words compounded of two roots which are taken from different languages — are very rare, and to be received with suspicion, Talbot has suggested that our word may have been originally the French or Norman "la dormeuse," the second syllable of which would soon be corrupted, by country people, into *mouse*.

The word *mouse*, itself, is a very ancient and wide-spread name. In Anglo-Saxon it is *mus;* in German, *maus;* in Latin, *mus;* in Greek, μῦς. It is ordinarily derived from a root which is expressed in the Greek μυεῖν, to hide, although Pott considers that it may come from the Sanscrit *mush*, to steal.

Rat is the French *rat*, and appears in modern Latin as *rattus*. Wachter refers its origin to the German *reissen*; Anglo-Saxon, *hreddan;* our own *rid;* to which the Latin *rodo*, to gnaw, is akin. The name, therefore, may combine the ideas of gnawing and plundering. It is difficult to account for the name of *Norway rat*, as this species is aboriginal to Asia, and was not even known to exist in Norway when our name was given to it. There is an ill-natured tradition that it was introduced to our country by the same ship as brought in the Hanover dynasty; but this throws no light on the name: more probably it was imported on board of some Norwegian trader, which may have touched at one of our ports.

Hare is a word that has sadly puzzled etymologists. Conjectures concerning its origin are innumerable, and, as it has no equivalent in the Latin and its kindred languages, its affinities are very hard to trace. It is the Anglo-Saxon *hara*, and it is the same word in Swedish. In Dutch and German the *r* gives way to *s*, as it is Dutch *haas*, German *hase*. One very plausible conjecture is that the word is akin to the Anglo-Saxon *hær*, hair; from the long soft fur of the hare. It has been suggested to me by a friend that it may come from the same root as our *hoar, hoary;* Anglo-Saxon, *hara;* in allusion to its prevailing colour. Talbot says, "Hare, the most timorous of animals, is perhaps named from the Anglo-Saxon *earg*, timid; *earh*, swift." *Leveret* is the French *lièvre*, Latin *lepus*, and is closely akin to the French *lapin*, rabbit. Indeed a close search will reveal to us a very curious connexion existing between the names for the *hare* and *rabbit*, in the kindred languages. The root is to be found in the Latin *levis* and our word *leap*, indicative of lightness and agility.

Rabbit is akin to the Dutch *robbe*, which probably comes, as Skinner suggests, from the Latin *rapidus*, our *rapid*. It would not be difficult to establish the etymological identity of this word with the

French *lapin*, and, so, with *lepus*, *leveret*, &c., but the pages of the 'Zoologist' are hardly suited to such an attempt.

Cony is the Latin *cuniculus;* German, *canichen;* Danish, *kanig;* Welsh, *cwningen.* Pliny supposes *cuniculus* to be so named from its burrows, but this can hardly be the case. In Greek we find the forms κόνικλος and κύνικλος, but there is some doubt as to whether this be a genuine Greek word, or only the Greek way of writing the word which they borrowed from the Romans. Should it be a truly Greek word, I have little doubt that Mr. Bell's etymology from κονέω, to hasten, would be correct, supported as it is by the analogy of the names for leveret and rabbit.

The *Guinea pig* is hardly an indigenous animal, but as Mr. Bell gives it a place in his 'History of British Quadrupeds,' we may take the opportunity of pointing out the solution of a difficulty which he seems to have experienced. He says, "The name by which this little animal is commonly known is founded upon an error of which I have in vain endeavoured to trace the origin; for I do not find, in any author by whom it is mentioned, any allusion to its being a native of Guinea. The country from which it truly derives its origin is the southern part of the South American Continent,—Brazil, Guiana, &c." Obviously its name originally alluded to the latter province; but as this was an unfamiliar name to most people, while *Guinea* was a "household word," the substitution of the wrong name for the right one would follow almost as a matter of course.

I have now completed the task which I at first proposed to myself; and I would fain hope that at all events *some* readers of the 'Zoologist' have been interested in the remarks I have made. I must again repeat one of my preliminary observations, that I have no doubt I may have made many mistakes. I therefore most earnestly solicit a personal correspondence with any one who is willing to correct me or to afford me hints. I have now collected the origins of about 2600 names of animal, vegetable or mineral objects, and I have exhausted all the means of information within my own reach, and have still a stock of at least 1200 names of which I can find no explanation, but with regard to which I trust that others will be found both willing and able to assist me.

P. H. Newnham.

Guildford, November 19, 1857.

On Bavarian Sporting.

By the Rev. Alfred Charles Smith, M.A.

I have just been reading (Zool. 5806—7) Dr. Collingwood's graphic account of the game-market at Vienna, and his description brings vividly to my recollection a similar scene at Munich, in the winter of 1840—1, which I spent in that capital; and on looking back to my journals of that date, by way of refreshing my memory on the subject, I have stumbled on some memoranda of various royal hunts of which I was an eye-witness, and by which these markets were supplied. Thinking that perhaps a short description of them may be of interest to the readers of the 'Zoologist,' I venture to transcribe again from my journals; but, for the benefit of those who have had no experience of Munich in the winter, I will first say a few words of that capital and its climate during the cold months, when these royal battues took place. I will premise, then, that Munich is the highest capital in Europe, though, not having a Murray at hand, I cannot state accurately how many feet it stands above the level of the sea. It is situated in a vast plain, or rather in the centre of a large basin, surrounded indeed by mountains, but all of them at a great distance; and on whichever side of the city you may approach you will see for many a league the great kettle-drum-looking domes or cupolas on the summit of the two towers of the Dom Kirche, standing up as beacons to guide you on to your journey's end. The plain, too, in which the city stands is truly Bavarian, not only so vast and apparently interminable, but perfectly flat, and its surface unbroken by hedges, banks or any other kind of fence, since fences are not wanted in a country where the cattle are never turned out to grass; and in the autumn, when the crops are off the ground, you may strike off from the highway immediately after leaving the town, and ride in any direction, so long as the open weather lasts. But though Munich is one of the sultriest and certainly the very dustiest of towns in the summer, it is one of the very coldest in the winter, without shelter on any side, and exposed to all the winds of heaven: for four months the weather is very severe, and the cold is intense; and there is no *gradual* change, but in a single night you pass from the height of summer to the depth of winter: from November to March the snow lies frozen and trodden into a hard, solid mass: all wheels disappear from the streets, and the silent sledges, unheard save through their jingle of bells (which the police rigidly require

them to carry), come stealing round the corners and along the streets at a very rapid pace. Occasionally sentinels are found frozen at their posts, though the guard is relieved at very short intervals, and all are well provided with warm clothing against the intense cold. The rapid river Tsar is arrested in its course, and soon becomes a dense mass of ice; and for four months winter reigns triumphant, without an interval of a thaw or the remotest prospect of a thaw for a single hour.

Such is the climate and such the situation of the Bavarian capital; but, notwithstanding the cold, the air is clear and the sun shines cheerily; and when it was announced that the king would shoot hares at a certain spot about two leagues distant from the town, it required no second summons to persuade four Englishmen to drive to the spot, eager to be spectators of the scene. When we reached the ground the royal sportsmen had not yet arrived, but a large number of keepers stood ready, and pointed out to us the most astounding preparations for sport I ever beheld. For two days previous to the hunt a large number of peasants had been employed to beat up the country for several miles round: this they effected by making a cordon, encircling the game and walking up towards the centre; and thus they gradually drove the hares in immense numbers into a very small space, viz., a little cover of perhaps four acres in extent: the hares so driven up had been enclosed by a wall of canvas from nine to ten feet in height, and when the keepers took us inside the enclosure, prior to the arrival of the king, there were the wretched victims lying huddled together like a dense flock of sheep, to the number of sixteen hundred, as we afterwards ascertained on counting the slain. Presently the royal sledges arrived with the king (now the ex-king) Ludwig, the Crown Prince (the present King of Bavaria), Prince Luitpold, Prince Max, and two other royal princes, for none but royal princes may shoot in these right royal battues: immediately they entered the canvas wall, and took up their positions at the farther end of the enclosure, each within a certain little nook of boughs, waist high, which had been previously prepared, of fir branches; whether as a protection against the rage of wounded hares, or as a pretence at ambush, I know not: and now the sportsmen are all standing behind their respective defences, in a line, about twenty yards apart from one another, and with their faces towards the canvas wall, which might be thirty yards in their front, each armed with a double-barrelled gun, and each with a whole posse of keepers behind him, with other guns to load and hand over. The word is given that all is ready; and now

the keepers and others, with whom we marched, forming a close line, began to walk up from the other end of the enclosure, driving all the unfortunate hares in a body towards the guns; as they neared the shooters they naturally ran to the sides; and now they were hunted round the open space, and made to run the gauntlet in front of all the guns: then the murder began in earnest, and for the first ten minutes each royal forefinger was continually engaged in pulling trigger after trigger, for as fast as each sportsman shot off his gun another was handed in its place. The hares at first came round in perfect droves, and then it was not only impossible to miss, but also impossible to kill without wounding many others; so then a horrible sight ensued, of hares unnumbered shuffling about with broken legs, wounded in every possible way, half-dead, bleeding, and uttering their mournful cry, so like the cry of a child. Soon the ground in front of the shooters was white with dead hares; still the slaughter went on, at first amidst a roar of guns, then a dropping fire, then single guns at longer intervals, then occasional shots, then it ceased, but not till every one of the hares enclosed had been driven round and round till it had met its death: happy were those first slain, for, once enclosed within the canvas, escape was impossible: if the poor animal had run the gauntlet before all the shooters once or twice, and had escaped unharmed or with a broken leg, the third or fourth round must destroy it: nothing living could escape. An unlucky squirrel, appalled at the noise, descended a tree close to the king, who, with a shout of delight, ruthlessly shot it as it gazed at him in amazement from the ground at about ten yards' distance, proving that if "a cat may look at a king" the old adage does not hold good with a squirrel, for this poor unsuspecting innocent paid for its temerity with its life. About twenty roe, bucks and does, had been accidentally enclosed with the hares, and these, too, must of course suffer the same fate, and were shot in like manner, save and except five or six bucks, which, terrified at the first noise of the shooting, and not yet having been shot at, ran back towards the advancing line of keepers, who immediately raised their hands and sticks to turn them; but, led by one noble fellow, the bucks took a spring right over our heads, hats and uplifted sticks, not a little to the delight of the Crown Prince, who, priding himself on his English habits and ideas, and knowledge of the English tongue, told us, he "would give any sum for a hunter who shall jump so," though, as the Germans never hunt or leap, and indeed there are no fences in Bavaria, we did'nt see of what possible use to his Royal Highness such a fencer would have been. Some of

the roebucks, when driven to desperation, charged the canvas wall, and most of them fell back, unable to clear so great a height; but three splendid fellows, more nimble and more fortunate than their companions, cleared it in great style and escaped. At length the shooting grew slacker and slacker, and after two hours' firing the massacre was ended: then before each sportsman's bower of firs were placed, in rows, the hares that were slain by him, and were lying dead in front of his stand; then they were counted, and great rivalry existed among the shooters as to who had gained the greatest score. The whole number killed was above 1600, and the king, who was always especially friendly and communicative to the English, observed to us, "There is so much more glory in killing them thus than if we only killed a dozen or so as you do in England." It would have argued a sad ignorance of Court etiquette to demur at any proposition His Majesty might think fit to assert, so we contented ourselves with a smile and a bow, but we secretly entertained rather a different opinion. The hares were now suspended on poles, and these were laid across some light waggons, and thus three waggons loaded with hares trotted triumphantly into Munich to the king's cellar, where on the following day hares killed by royalty were sold to the public at thirty-six kreutzers apiece, or about one shilling English. At a subsequent battue the same party killed 1200, and on another occasion 900 hares; but, as all the hare-hunting consisted of this abominable massacre, we did not care to go a second time.

It may be supposed we were a little disgusted with what we had seen of Bavarian sport; but when we were invited to witness a stag hunt we said to one another, "Now at least we shall see something more worthy of the name:" judge, then, of our disappointment when, on arriving at the wood fixed on for the rendezvous, we found the preparations in all respects like those made for the hare hunt; the canvas walls, the posse of keepers ready to drive the game round, the nooks of fir branches for the shooters, all as before; indeed, excepting that the wood was larger, the canvas walls something higher, and that rifles were substituted for guns and roe for hares, it was the same unsportsman-like massacre we had seen before. There was a good deal of bad shooting displayed on this occasion, and some of the stags, after being driven about and shot at a good deal ineffectually, became at last so terrified that they laid down and refused to get up. At the conclusion it was found that about fifty bucks were shot, and these, too, were taken to the king's cellar and disposed of next day, just as

the hares; and loyal subjects could there buy royal venison at nine kreutzers (threepence) per pound.

After this fresh instance of barbarous murder we were not very sanguine when we started to see "a wild boar hunt," for in such terms it was announced to us; and yet we had a lurking hope that there might be some sport in this, but again we were doomed to disappointment; and when we arrived at the place appointed (the middle of a large forest) what was our dismay to find that this hunt, too, was to be conducted precisely as the hare and stag hunts had been: there were the canvas walls, within which were the poor boars, driven up by the peasants as before; and not only boars, but pigs of all sizes and ages; all were driven in, and all shot alike, the total number amounting to about forty; none of them appeared savage, indeed they were only half wild, as every day they came for food, placed for them at the skirt of the forest; but some of the boars had tusks of considerable size, with which they might have done considerable mischief if they had courage enough for an attack; but they seemed too frightened to make any resistance, and ran squeaking from place to place in the extremity of their terror, till a bullet put an end to their misery. The head gamekeepers, or "Jägers," were splendid fellows in their suits of green and gold, with epaulettes and swords and sashes, and plumes of dark green feathers in their cocked hats, rather a contrast to the shooting-jackets and leggings of the business-like men we are accustomed to meet at the cover side; however, it was all quite consistent with the sport, and the "Jäger's" fine clothes were not soiled with hard work, but they looked very smart in the forest; and very valiant, too, they were withal, for, when one poor unfortunate piggy came running down a green drive towards us, squealing with terror, one of these brave armed men, dropping down on one knee in a theatrical attitude, exclaimed, to our intense amusement, "Gentlemen, don't be alarmed; I will defend you," with which words he drew his sword, and presented it at the pig; but he, poor fellow, as soon as he saw us in the way was only too glad to hurry off out of sight into the thicket. After this hunt wild boar was as plentiful and cheap at the king's cellar at Munich as hares and venison were at other times.

If any comparison can be instituted among the above atrocious massacres, I am inclined to think that the latter was the most barbarous of the three hunts; and I don't doubt that those sportsmen will agree with me who have been accustomed to hog hunting in India, which I conclude to be the finest sport (in the true sense of the word)

that exists, and which undoubtedly requires the greatest exertions and skill on the part both of the horse and rider. I had almost appended some account of the rifle shooting at a mark by the Tyrolese who flock to Munich at certain seasons, and which was really interesting to witness; and also of the horse racing in the same capital, one of the most horrible sights I ever beheld; but, recollecting that such subjects scarcely come within the province of the 'Zoologist,' and fearing the wrath of its excellent editor, I spare the readers of that periodical, at any rate for the present, and conclude.

ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne,
November 9, 1857.

The Mollusca of the Firth of Clyde.

By the Rev. ALFRED MERLE NORMAN, B.A.

(Continued from page 5713).

Fam. X. *Donacidæ.*

*Donax Anatinus (*Donax trunculus*). Included in the lists of Mr. Smith and Dr. Landsborough, but I have not met with it myself.

Fam. XI. *Mactridæ.*

Mactra solida. Bute, Cumbrae and Arran, but it is not a common shell in the district.

* „ truncata. Bute, *Smith*; Lamlash Bay, *Landsborough.*

* „ elliptica. Occasionally taken with the dredge on hard ground in the coralline zone. The specimens from off Cumbrae exceed in dimensions any that I have taken or received from elsewhere; an individual in my cabinet measures one and a quarter inch long and four-fifths of an inch broad.

* „ subtruncata. Is a very abundant shell in the Clyde, and is known in the district by the name of "Aikens." It is frequently used for bait, and is usually found in the sand at low-water mark, and is either raked up from the sand, or gathered by the hand when thrown to the surface by storms. Millport Bay, Lamlash and Ardrossan are prolific localities for it. It attains a large size here, examples commonly exceeding one and a quarter inch long and an inch broad. "A large and much-produced variety is very common on

the Ardrossan sands, in Ayrshire; a similar but smaller one is also common in Lamlash Bay, Isle of Arran, where it is gathered alive at low water to feed pigs (Alder)," *F. & H.* Dr. Landsborough tells us that the name "Aikens," applied to Mactra subtruncata, is confined to the Lowlands; "in the Highlands it is called 'Mureck-baan;' baan denoting the colour, which is white; and Mureck, it is probable, being the Celtic origin of the Latin Murex, the shell-fish which yielded the Tyrian dye or imperial purple." — *Lands. Excur.* p. 218. I must confess that my powers of imagination are at fault, and that I fail to see any connexion between Murex trunculus and Mureck-baan!

Mactra Stultorum (*Mactra cinerea*). This species, together with its variety cinerea, is said by Dr. Landsborough to occur in Lamlash Bay. I have not myself met with it there, or elsewhere in the district. Ayr, *Smith.*

*Lutraria elliptica. During very low spring tides a sand bank is laid bare at Fintry Bay, Cumbrae, extending along the shore, from which it is separated by a belt of water a foot or so deep; at such times fishermen and others go to the bank for the purpose of procuring "Spout-fish" and the Lutraria, which they take there abundantly and of great size. I have likewise taken young specimens with the dredge between Clachland Point and the Corriegills, Arran.

Fam. XII. *Veneridæ.*

*Tapes decussata (*Venus decussata*). This local, but for the most part, where present, abundant shell, must, I think, be regarded with some doubt as a native of the Clyde. Dr. Landsborough mentions it twice (at pp. 337 and 362) in his 'Excursions,' but he does not give it in his more recent lists; nor has it been met with by Mr. Smith or myself.

* „ pullastra (*Pullastra vulgaris, Venus pullastra*). Common here as everywhere. Very good examples of the variety perforans, with the shell strongly laminated, especially at the posterior end, occur in crevices in the masses of shale on the shore of Lamlash Bay, and in old Pholas burrows.

* „ virginea (*Veniorupis virginea, Pullastra virginea, Venus virginea*). Ayr, Bute, Clyde, *Smith.* I have taken unusually large specimens, measuring two inches and four-tenths long, and one and a half inch broad, off the west of Cumbrae. It is frequent in the coralline zone in all parts that I have dredged.

„ aurea (*Venus aurea, Venus ænea*). Mr. Smith records this shell from Ayr, and Dr. Landsborough from Arran. At Loch

Ryan, to the south of this district, it may be procured in great abundance at low-water mark; specimens from this locality are in the British Museum.

Venus verrucosa. I include this with doubt. Mentioned once by Dr. Landsborough (Excurs. p. 362) in a list of Lamlash Mollusca.

„ casina (*Venus reflexa, Venus cassina*). This beautiful Venus is met with occasionally on the scallop-bed off the south-west of Cumbrae; it is, however, by no means abundant, and I only succeeded in procuring some half-dozen specimens. I have likewise taken it in Lamlash Bay, and Mr. Smith records it from Ayr. It is probably distributed throughout the district.

* „ striata (*Venus Prideauxiana, rugosa, gallina* and *laminosa*). Common, and is found with the concentric costellæ at a greater or less distance apart, and more or less laminated.

* „ fasciata. Frequent throughout the district. The colour of these shells from the Clyde are usually dull, and have none of that brilliancy which characterizes their more southern brethren. They are usually, moreover, when found in the Clyde, invested, especially about the umbones, with a black incrustation.

„ ovata. This species is common among nullipore in the laminarian and coralline zones.

*Artemis exoleta (**Cytherea exoleta*). Two very distinct varieties are to be found in the Clyde district; the first, the ordinary form, occurs in and outside Lamlash Bay and other localities; the second is brownish white, entirely devoid of painting, and has the striæ much more closely arranged than usual, and they, moreover, become somewhat raised and lamelliform at the extremities. This last variety, which measures two inches by two and an eighth, is taken near the Tan Buoy, Cumbrae.

„ lincta (*Cytherea sinuata* and *lincta*). Ayr, Lamlash, Cumbrae, Largs. The locality in which I have found it to be most numerous is between the Cumbraes. I have a distortion in which one valve is larger than the other, the one umbone projecting forwards over the smaller one as in the genus Corbula.

*Lucinopsis undata (*Lucina undata*). I have occasionally met with the Lucinopsis to the south-west of Cumbrae, and Dr. Landsborough has taken it in Lamlash Bay.

Fam. XIII. *Cyprinidæ.*

*Cyprina islandica (*Cyprina vulgaris*). The dredge will not unfrequently bring up the Cyprina from deep water where the ground is

hard. The west of Cumbrae between Fintry and Shell Bays; between Clachland Point and the Corriegills, Arran; and north-east of Holy Island, may be mentioned as localities.

Circe minima (*Cyprina minima, Cyprina triangularis*). This often beautifully marked shell is common in the deeper parts of the laminarian zone in the Clyde district. Wherever suitable ground, that is nullipore, is present, the dredge will seldom come up without containing one or two examples.

*Astarte sulcata (*Crassina scotica, Crassina danmoniensis, Astarte scotica* and *danmoniensis*). By no means common, though now and then to be met with. West coast of Cumbrae, and Lamlash Bay; Ayr, Bute, *Smith.*

* „ elliptica (*Crassina garensis, Crassina elliptica*). "It was first discovered near Helensburgh, mouth of the Clyde, by H. Witham, Esq., where it appears to be not uncommon." — *Brown.* "The earlier specimens which found their way into collections were chiefly collected by Mr. Nicol, and distributed under the MS. name of gairensis."—*F. & H.* It was so named from Loch Gair, or Gare, at the mouth of which Helensburgh is situated. Mr. Smith has also taken it off Bute. It is, however, very local.

* „ arctica (*Crassina corrugata* and *Withami*). Mr. Smith includes this in his list of recent shells, under the specific names of corrugata and Withami, as having been found in the Clyde and off Bute. Withami is figured by Mr. Smith in his paper; and he tells us that "one valve was dredged in deep water in Rothesay Bay, apparently the same as that found by Mr. Witham in Yorkshire." Astarte arctica, if met with in the Clyde, is probably fossil.

„ compressa (*Crassina compressa* and *striata*). Lamlash, *Landsborough;* Bute, *Smith.*

„ triangularis. I have met with a few examples of this little Astarte among shell-sand from "Landsborough's Bay," Lamlash.

Isocardia Cor. Dredging one day in deep water between Great and Little Cumbrae, I procured two or three single valves of the heart shell. This is the only instance of its occurrence in the district with which I am acquainted. Although the shells had been some time dead, they were certainly not semi-fossil; indeed, the Isocardia has not, I believe, been met with in the glacial beds of the Clyde.

Fam. XIV. *Cardiadæ.*

Cardium aculeatum. Mentioned by Mr. Smith, undoubtedly in error, as "common" in the Clyde.

*Cardium echinatum (*Cardium ciliatum* and *ciliare*). To be found in many of the sandy bays, as for example at Fintry Bay, Cumbrae; and in certain parts of Lamlash.

* „ edule (*Cardium crenulatum*). Nowhere, as far as my observations go, abundant, though generally diffused.

„ nodosum. Fine and by no means uncommon. Shell Bay, Cumbrae; Largs; Lamlash Bay; and between Clachland Point and the Corriegills, Arran.

„ fasciatum (*Cardium elongatum*). Frequent in the laminarian and coralline zones. Fairleigh; Tan Buoy, Cumbrae; Lamlash.

* „ pygmæum (*Cardium exiguum*). Ayr, Bute, Clyde, *Smith;* Lamlash, *Landsborough.* I have not myself been fortunate enough to meet with it.

„ suecinum. Included by Dr. Landsborough in his last corrected catalogue of the Lamlash Bay Mollusca.

* „ norvagicum (*Cardium lævigatum* and *serratum*). Frequent and widely distributed throughout the district. There are two very distinct forms of this shell: the one which is found in the Clyde is subtriangular, the hinder margin being much produced, so that the length exceeds the breadth; two inches and three-fourths long and two inches and five-eighths broad is the measurement of my finest specimen: the other variety, which I have taken off Falmouth, is subovate, the hinder margin suddenly sloping, and not at all produced, the breadth exceeding the length, as, for example, one inch and three-fourths long and two inches and one-fourth broad. On the Devon coast I have taken an intermediate form, in which length and breadth are about equal; it is this form which is figured in Forbes and Hanley.

Fam. XV. *Lucinidæ.*

*Lucina borealis (*Lucina Radula*). Ayr, *Smith.* It is not uncommon in shallow water just off the pier at Lamlash, and I have likewise taken a specimen or two in Kames and Shell Bays, Cumbrae.

„ spinifera (*Myrtea spinifera*). Occurs several times in the lists of Lamlash Bay Mollusca in Dr. Landsborough's 'Excursions.' I have not myself met with it.

* „ flexuosa (*Lucina sinuosa*). Bute, Ayr, *Smith.* Widely distributed in the district, though nowhere common. Largs, Cumbrae, and Lamlash Bay have given me specimens. The spot in which I have dredged it most frequently is close to the Clerk Rock in

Millport Bay; at least thirty single valves may be taken to every perfect specimen.

Fam. XVI. *Kelliadæ.*

Montacuta ferruginosa. I have met with a few fine examples thrown up on the sand at Millport Bay after gales from the West, having the animal still in them. It has likewise been taken by Mr. Alder and Dr. Landsborough in Lamlash Bay.

„ bidentata. Occurs occasionally in rock-pools, as for example at the outer Allans, Cumbrae; and Clachland Point, Arran. It likewise may be found sparingly among Lamlash Bay shell-sand.

„ substriata. Fourteen examples fell to my lot from the spines of Spatangus purpureus taken off the west coast of Cumbrae. Dr. Landsborough several times met with it in Lamlash Bay (Lands. Excurs. pp. 195 and 322).

Turtonia minuta (*Montacuta purpurea*). By no means rare in rock-pools, if the Corallina be gathered and washed, and the sediment examined. The Allans, Cumbrae; and Clachland Point, Arran, afford it in some plenty.

*Kellia suborbicularis (*Mya suborbicularis*). Distributed throughout the district. The best situations to look for it in are the interiors of old dead bivalve shells filled with mud. The young may be taken occasionally in rock-pools.

„ rubra. Common, though somewhat local. Abundant among Balani which clothe the rocks just north of Fintry Bay, Cumbrae; and frequent in rock-pools, among Corallina officinalis and Lichina pygmæa, at Clachland Point, Arran. A white variety occurs in this last locality.

Lepton convexum. Lamlash, *Landsborough.*

„ nitidum. Mr. Webster has informed me that among a small quantity of Lamlash Bay shell-sand which I sent him he met with a single example of Lepton nitidum.

Fam. XVII. *Mytilidæ.*

*Mytilis edulis (*Mytilis pellucidus*). Abundant in the Clyde above Greenock, but further down it is by no means so, specimens being few and far between.

*Modiola modiolus (*Modiola vulgaris*). Frequently taken both at low water and with the dredge, but full-grown specimens are scarce, and I am not aware of any locality in which it occurs gregariously.

Modiola phaseolina. Lamlash, *Landsborough.*

Crenella discors (*Modiola discrepans*). The young very abundant among Corallina in rock-pools; large specimens, however, rare. A small stunted form is found at the outer Allans, Cumbrae.

* „ marmorata (*Modiola discors*). Ayr, *Smith.* Not rare within the tunic of Ascidia mentula. From a single specimen of this Ascidia, dredged at Cumbrae, I extracted no less than eleven Crenellæ, some of them very large, such as I have never seen except from the West of Scotland. Dr. Landsborough mentions that Major Martin has dredged this species near the Corriegills, "buried in the coriaceous coat of Ascidia rustica" (Lands. Excurs. p. 49).

„ decussata. Lamlash, *Landsborough.*

Fam. XVIII. *Arcadæ.*

*Nucula Nucleus (*Nucula margaritacea*). Common throughout the district in suitable localities: Largs, Fairleigh, Cumbrae, Rothesay, Lamlash, Ayr.

„ nitida. I have taken one or two specimens at Cumbrae, but it appears to be very rare. Bute, *Smith;* Lamlash, *Landsborough.*

„ radiata. "Lamlash, Arran (Alder)," *F. & H.*

* „ tenuis. Forbes and Hanley inform us that "this essentially northern species" occurs in the Clyde district. Mr. Smith records it from Bute, and Dr. Landsborough from Lamlash. It must, however, certainly be very rare, as it has never fallen to my lot to meet with it.

*Leda caudata (*Nucula minuta, Nucula rostrata*). Very rare. Clyde, Bute, *Smith;* Lamlash, *Landsborough*). A single living specimen is now in my cabinet, which was dredged by Mr. W. Templer at Largs, and given me by Dr. Lowe.

* „ oblonga (*Nucula oblonga*). Ayr, *Smith.*

„ truncata (*Nucula truncata*). Ayr, *Smith.* On this and the last-mentioned species, admitted by Mr. Smith, of Jordan Hill, into his catalogue of the recent shells of the Clyde, Forbes and Hanley thus write:—"In consequence of the pleistocene tertiary beds of clay on the west coast of Scotland being often laid bare below low-water mark, fossil shells are frequently brought up in the dredge along with recent ones, and as often cast on the shore. Owing to their extremely fresh appearance, even the epidermis in many instances being preserved with its pristine colours and lustre, it is very difficult to say at a glance whether such specimens be not the exuviæ of animals yet living in the neighbourhood. This difficulty is yet further increased

by the possibility which always exists of the species in question yet lingering alive (as indeed we have seen in the case of Leda pygmæa), in some limited tract or boreal patch in our seas. Until, however, such is proved to be the case, we cannot admit well-known and characteristic drift species into our list of living forms, and in this category we must place Leda oblonga (*Nucula oblonga*, Brown, Ill. Conch. G. B. p. 84, pl. 33) and Leda truncata (*Nucula truncata*, loc. cit. p. 84, pl. 33), both of which, however, are still found living in Arctic regions."—*F. & H.* vol. ii. p. 232, 233.

*Arca lactea. Two or three were taken some years since near the Corriegills, Arran, by Dr. Landsborough and Major Martin; but John Kelso (the boatman whom I would recommend conchologists to employ at Lamlash), who accurately described the shells, tells me that, though he has repeatedly dredged there since expressly for it, it has not since been met with.

*Pectunculus glycimeris (*Pectunculus pilosus*). Very local. Arran, Ayr, *Smith*. It occurs to the north-east of Holy Island in deep water, and there is also a series in the British Museum from the Island of Bute.

Fam. XIX. *Aviculaceæ.*

Pinna pectinata (*Pinna ingens*). "The Pinna ingens has only once, that I know of, been got at Arran."—*Lands. Excurs.* p. 60.

Fam. XX. *Ostræadæ.*

Lima subauriculata. I have met with single valves of this shell in Lamlash Bay, where Dr. Landsborough has also taken it.

„ Loscombii (*Lima fragilis*). A single valve near the Tan Buoy, Cumbrae. Bute, *Smith;* Lamlash, *Landsborough.*

„ trians (*Lima tenera*, *inflata* and *vitrina*). This is one of the most interesting Mollusca of the Clyde, and is abundant almost everywhere in the district among nullipore. Kelso tells me that when first Dr. Landsborough began to dredge at Lamlash, Lima trians could only be found in one confined spot in the Bay: it is now to be met with in all parts. Doubtless dredging has been the chief means in effecting this diffusion, since in overhauling the nullipore young specimens would, as the boat moved on, be thrown overboard here and there, and become the parents of a numerous progeny. Nothing can be more lovely than the animal of Lima trians; its thousand delicate and beautifully ringed vermilion tentacula, each maintaining, as it were, a life independent of its neighbour's, turning

and twisting in every direction; the rich crimson foot and snow-white shell, form an object which, to my eyes, is unsurpassed among the British Mollusca. The animal has the power of darting itself through the water, by flapping the valves of the shell in the same manner as the Pectens. The economy, however, of this mollusk, as found in the Clyde district, is by no means the least interesting part of its history. At Herm I have taken it living free in rock-pools at the Galeomma ground, but in the Clyde it always inhabits a nest; I say always, because when specimens are found free I am of opinion that the circumstance is merely accidental, from the nest having been broken by the dredge, or from the Lima having voluntarily and temporarily quitted its usual domicile. The nest in which the Lima lives is frequently as much as eight or ten inches long; indeed, I think some which I have seen must have been a foot. It is formed of nullipore, stones, shells and sea-weeds, strongly fastened together by means of byssal threads; the interior is lined with a thick network of similar threads, the interstices being filled up with slime, so that it forms a smooth tube, in which the Lima takes up its abode, and where it is free from the attacks of fish and crabs, to assaults from which its widely gaping valves would otherwise greatly expose it. Here we see one of the many ways in which Providence provides for the safety of those Mollusca which, if unprotected by some artificial means, would be peculiarly open to attack. We have other instances in the boring powers of the Pholades and their allies, the rapidly burrowing abilities of the Solens, the curiously formed nest of Gastrochæna, and the great muscular power of the Patellidæ, which enables them to cling so tenaciously to the rocks. Forbes and Hanley "have never seen any but full-grown specimens contained in these curious nests;" they must have been singularly unfortunate, for I have repeatedly found the Lima of all sizes encased alike. There is but one thing I have to say against this interesting molluscan, and that is, the animal has a peculiar, tenacious, and, to me, sickening odour; after having handled a number of them it is no easy matter to remove the smell from the hands with soap and water, and so strong a hold has the nauseous smell sometimes taken on my olfactory nerves that a whole night has scarcely sufficed to remove the impression. Professor Balfour has informed me that the slime with which the nests are lined is very rich in Diatomaceæ, and that its examination will well repay the trouble of the diatomist.

*Pecten varius. Bute, Ayr, *Smith;* Lamlash, *Landsborough.*

„ niveus. Cumbrae, *Smith.*

*Pecten Pusio (*Pecten sinuosus*). Very far from common. I have taken two or three specimens moored to old shells in the laminarian zone to the west of Cumbrae, and as many more at Lamlash. Bute, Ayr, *Smith.*

„ striatus (*Pecten Landsburgii*, *spinosus* and *aculeatus*). This beautiful little scallop was first recognized as British in the Clyde, and described and figured by Mr. Smith in his paper in the Wernerian 'Transactions,' under the name of Pecten Landsburgii (Mem. Wern. Soc. vol. viii. p. 106, pl. II. f. 2) from specimens taken at Ayr. It is frequent in the district, and is generally found in about twenty fathoms. The channel between Largs and Cumbrae, the west of Cumbrae by Shell Bay and thence to Fintry, and a bed of rotten Pecten (opercularis) shells which lies a little to the south-east coast of Hamilton's Rock at the entrance to Lamlash Bay, are good localities. A specimen dredged at Lamlash was, when first taken, one of the most lovely shells I ever saw; its chocolate-brown ground-colour was sprinkled all over with flakes of azure blue; I am sorry to say, however, that this beautiful tint gradually paled, and that now the flakes are white. It is a very rare occurrence to find colour evanescent in a shell; indeed, this is the only instance that has come under my observation of a shell, in the cabinet, losing its colour.

* „ tigrinus (*Pecten obsoletus* and *lævis*). This Pecten is found in about equal numbers to the last, and in similar situations; Dr. Landsborough, however, mentions having "got, on the shore" at Catocol, at the north-west of the Isle of Arran, "some of the finest specimens he had ever seen of the beautiful Pecten obsoletus." I have an example from the Clyde of the "very charming and rare variation" mentioned by Forbes and Hanley, which "displays linear fillets of white upon a ground of reddish chocolate colour."

„ danicus (*Pecten nebulosus* and *Jamesoni*). The first British specimen of this shell ever taken was found at Cumbrae by Mr. John Blythe, of Glasgow, in 1835, and was described and figured by Brown, under the name of Pecten nebulosus, in the first volume of the 'Edinburgh Journal of Natural History,' page 49. Another variety, taken at Bute, was described by Mr. Smith in his paper on the recent shells of the Clyde, under the specific name of Jamesoni (Smith, Mem. Wern. Soc. vol. viii. p. 106, pl. II. f. 1). This Pecten lives in deep water among rocks; it is, therefore, difficult to procure it with the dredge; indeed, I have never done so, my specimens having all been procured from the fishermen, who now and then bring them up attached to the hooks of their long lines. Forbes and

Hanley give Loch Ranza, in forty fathoms, as a locality: my examples are from off Little Cumbrae lighthouse, the north of Great Cumbrae, and the east side of Holy Island.

Pecten similis (*Pecten tumidus*). The only locality in which I am aware of this shell being taken is among the old scallops of the bed to the south-east of Hamilton's Rock, Lamlash; I have there taken three living examples, and numerous single valves.

* „ maximus. Occasional in deep water throughout the district. Formerly abundant in Lamlash Bay, but, having been extensively dredged for the market, it has become scarce. Dr. Landsborough mentions a very large specimen taken at Cumbrae measuring "eight inches in length and seven and a half in breadth."

* „ opercularis. Very common, and in certain spots excessively abundant. There is a large bed of them extending from the Tan Buoy, Cumbrae, in a northerly direction, from whence they are extensively dredged for bait for the long lines. The most common painting in the district is rich brown mottled with white, or the whole of the costæ (not merely the summits as in lineatus) pink with the interstices white; rich yellow and orange examples are also not uncommon, but I have never observed pure white examples, nor the variety lineatus, among the thousands that have passed through my hands in the Clyde. The name by which the scallops are known in the West is "Clams."

* „ islandicus. "Is an abundant fossil in the pleistocene beds of the Clyde, and may be found in numbers at low water in the Kyles of Bute, as was observed by Mr. Smith, of Jordan Hill," *F. & H.* "Pecten islandicus, which is regarded as a rare shell, is found in considerable plenty in winter and spring on the shore of Fintry Bay, but these are always dead, and I doubt not from some post-tertiary deposit."—*Lands. Excurs.* p. 420. It is probable that the deposit from which this shell was thus washed up some years ago in Fintry Bay is now exhausted, as a single broken valve is all that has rewarded my repeated search in that locality after gales. There can be no doubt but that all the examples of this shell which have been taken in the Clyde, either with the dredge or otherwise, are fossils, comrades of Panopæa norvagica and Tellina proxima, the characteristic forms which inhabited the waters of the Clyde during the glacial period.

*Ostrea edulis (*Ostrea parasitica*). I am not aware of any spot in the Clyde where oysters are sufficiently abundant to reward the dredger for his trouble in procuring them; a few, but only a few, may occasionally be taken off Fairleigh, and in other widely distant parts.

The variety parasitica occurs at Lamlash, and may be procured also from the rocks, at low-water mark, in Balloch Bay, Cumbrae.

*Anomia ephippium (*Anomia squamula* and *cylindrica*). Never occurs of large size, the variety squamula being the most common form.

* „ aculeata. Rare. Bute, *Smith;* Cumbrae, Lamlash.

* „ patelliformis (*Anomia undulata*). Very rare. I have only procured two or three specimens.

„ striata. I have formerly sent this shell to many of my correspondents under the name of "patelliformis." My attention was kindly called to its being the true striata by my friend Mr. Webster. I have little doubt in my own mind as to the specific identity of these two shells, believing that the modifications which their form assumes are merely due to local causes of food and habitat. I am far, however, from prepared to go the length of Mr. Clark, who, taking up his position solely on malachological grounds, would unite all the British Anomiæ under one species; indeed, in order to reconcile the malachological differences which exist between the species, Mr. Clark is driven to compare a few isolated specimens of the young of patelliformis with full-grown ephippium. Anomia striata is abundant in the Clyde, and is found for the most part attached to the interiors of Pecten shells, though now and then living on the exterior; and in some localities (as outside the Bay of Lamlash) it lives upon stones. Examples from these last situations are not developed so evenly in all their parts as those found in the interior of bivalves, and present a rougher and coarser aspect; some now and then living on the edges of stones, and not having room to develope themselves, assume a tubular saddle-shaped form.

Div. III. Palliobranchiata.

Fam. I. *Terebratulidæ.*

Terebratula caputserpentis (*Terebratula aurita*). The only locality which has at present yielded this species in the Clyde is around Holy Island, more especially to the north-east, and between that and Hamilton's Rock. Clyde specimens are smaller, more ventricose, and have the costellæ larger and fewer in number than is usual in those taken among the Hebrides.

Fam. II. *Craniadæ.*

Crania anomala (*Orbicula norvegica*, *Crania norvegica* and *personata*). This remarkable bivalve (which it is impossible to make a

bivalve of if it be removed from the stone or shell to which it adheres, since the under valve is a mere layer of shelly matter insaperably united to the substratum) is common in the deeper parts in and outside of Lamlash Bay. I have also taken it, though less frequently, to the west of Cumbrae, and in other parts. The largest examples from the Clyde do not exceed half an inch in diameter.

Errata in the previous Part. — Page 5711, line 5, for "*Apatinidæ*" read "*Anatinidæ*"; line 22, for "*Amphidesma convexa*" read "*Amphidesma convexum.*" Page 5712, line 15, for "pellucidens" read "pellucidus." Page 5713, line 31, dele "I have" to "appears scarce"; line 34, for "*compressa*" read "*compressum.*"

ALFRED MERLE NORMAN.

Kibworth, Leicestershire,
October 28, 1857.

(To be continued).

Note on the Theory of Permanent and Geographical Varieties.

By ALFRED R. WALLLACE, Esq.

As this subject is now attracting much attention among naturalists, and particularly among entomologists, I venture to offer the following observations, which, without advocating either side of the question, are intended to point out a difficulty, or rather a dilemma, its advocates do not appear to have perceived.

The adoption of permanent and geographical varieties has this disadvantage, that it leaves the question "What is a *species?*" more indeterminate than ever; for if permanent characters do not constitute one when those characters are minute, then a species differs from a variety in degree only, not in nature, and no two persons will agree as to the amount of difference necessary to constitute the one, or the amount of resemblance which must exist to form the other. The line that separates them will become so fine that it will be exceedingly difficult to prove its existence. If, however, the two things are of essentially distinct natures, we must seek a qualitative not a quantitative character to define them. This may be done by considering the permanence, not the amount, of the variation from its nearest allies, to constitute the specific character, and in like manner the instability, not the smaller quantity, of variation to mark the variety. In this way you define the two things by a difference in their nature; by the other, you assert that they are of exactly the same nature, and differ only in degree.

Now the generally adopted opinion is that species are absolute independent creations, which during their whole existence never vary from one to another, while varieties are not independent creations, but are or have been produced by ordinary generation from a parent species. There does, therefore (if this definition is true), exist such an absolute and essential difference in the nature of these two things that we are warranted in looking for some other character to distinguish them than one of mere degree, which is necessarily undefinable. If there is no other character, that fact is one of the strongest arguments against the independent creation of species, for why should a special act of creation be required to call into existence an organism differing only in degree from another which has been produced by existing laws? If an amount of permanent difference, represented by any number up to 10, may be produced by the ordinary course of nature, it is surely most illogical to suppose, and very hard to believe, that an amount of difference represented by 11 required a special act of creation to call it into existence.

Let A and B be two species having the smallest amount of difference a species can have. These you say are certainly distinct; where a smaller amount of difference exists we will call it a variety. You afterwards discover a group of individuals C, which differ from A less than B does, but in an opposite direction; the amount of difference between A and C is only half that between A and B: you therefore say C is a variety of A. Again you discover another group D, exactly intermediate between A and B. If you keep to your rule you are now forced to make B a variety, or if you are positive B is a species, then C and D must also become species, as well as all other permanent varieties which differ as much as these do: yet you say some of these groups are special creations, others not. Strange that such widely different origins should produce such identical results. To escape this difficulty there is but one way: you must consider every group of individuals presenting permanent characters, however slight, to constitute a species; while those only which are subject to such variation as to make us believe they have descended from a parent species, or that we know have so descended, are to be classed as varieties. The two doctrines, of "permanent varieties" and of "specially created unvarying species," are inconsistent with each other.

ALFRED R. WALLACE.

On the Entomology of the Aru Islands.

By Alfred R. Wallace, Esq.

Almost all that is known of the insects inhabiting New Guinea and the adjacent islands is due to the French naturalists attached to the numerous discovery ships which have visited that part of the world. Many fine things have thus been made known to entomologists, although the total number of species collected is very small; and it may, perhaps, be considered as one of the least known and most promising regions that remain, now that the most remote parts of the earth are ransacked by enterprising collectors. These considerations induced me to make a voyage to Aru in one of the native prows which trade there annually, going with the west monsoon in December, and returning with the east in June. I expected that these islands lying so near New Guinea, and known to have some of their most interesting animal productions (the birds of paradise for example) identical, would yield me many New Guinea forms, and probably some identical species, and my expectations in this respect have been fully realized. The Entomology, the Ornithology, and certain peculiarities in the physical geography of these islands, prove to me that at no distant period (geologically) they formed a portion of the southern peninsula of that great island, and have been separated from it by a depression of the intervening portion (now a shallow sea), they themselves remaining almost or quite undisturbed. I believe, therefore, that the insects of Aru and New Guinea are as closely related as those of Great Britain and the Continent of Europe.

It was with considerable anxiety that, on January 8th, 1857, I took my first walk into the forest. The first insect I saw was not a very encouraging one: it was the common Diadema Ange, found over the whole Archipelago. A little further, however, and I was rewarded by Idea d'Urvillei, a beautiful Hyades, the lovely Damis Coritus, *Guér.*, and that superb insect Cocytia d'Urvillei. Two or three pretty Lycenidæ of genera unknown in the western parts of the Archipelago, Tricondyla aptera, and two species of the longicorn genus Tmesisternus, with several smaller insects, composed my first day's sport; and a very satisfactory one it was, for it assured me there was work to be done, and that I was really in the midst of a New Guinea Fauna.

I collected steadily for two months in this jungle, situated in the small island of Wamma, at one end of which is the Bugis settlement of Dobbo, where I resided. I got a great many nice things, but the

species were very limited in number, and a new one began to be a rarity. With all my exertions I could only muster 90 species of butterflies and 235 Coleoptera at the end of one month, which had increased to 108 and 340 in two months, with 150 Hymenoptera, 120 Diptera, and other orders scanty, making a total of 850 species of insects. Even this I believe is considerably more than all the New Guinea species yet known. Among my butterflies the finest thing was a superb Ornithoptera, differing very slightly from O. Poseidon of Doubleday. Females of this were abundant, some measuring 9½ inches across, the males scarcer and much more difficult to capture, so that I hardly got a really perfect specimen. The excitement of chasing this glorious insect may be imagined. The fine Papilio Euchenor, *Guér.*, was also by no means uncommon, but very difficult to take, having a wild zigzag moth-like flight. P. Ormenus, *Guér.*, was also often seen, but as rarely taken. Of a new species, near Ægistus, I got but a single specimen, and never saw another, and the rare and magnificent P. Ulysses I saw almost daily, without even a chance of obtaining a specimen. A Hamadryas, perhaps H. Zoilus, is one of the commonest of the forest butterflies, and, from its weak flight, most easily taken: It has all the appearance and habits of the Ithomiæ of S. America. Five or six species of Euplœa, and as many of Pieris, are abundant, some pretty little Satyridæ, and from 20 to 30 species of Lycenidæ and Erycinidæ, many of which will bear comparison with the loveliest gems of the Amazonian forests.

Among the Coleoptera the most remarkable things were six or seven species of Tmesisternus, a fine Gnoma, and a new genus allied to Golsinda, the males of which have the anterior coxæ armed with a long acute spine. The Curculionidæ contained several very fine Anthribidæ, one, the giant of the family, being near an inch and a half long, with very long legs and rather short antennæ; some singular Brenthidæ, the curious Arachnobos Gazella (Bois. Voy. de l'Astrolabe, t. 7, fig. 22), and a beautiful blue and black banded Curculio. Lamellicornes are almost absent from this region: nine species of the whole tribe were all that two months' work produced, and of these half were single specimens only. There is probably no other country where this extensive group is so near to being altogether absent. Two fine species of Lomaptera, however, are among this little lot,—I think both new: they fly about in the jungle near the ground, with a loud humming noise, and settle on rotten wood, never on flowers, except at the opening spathes of the cocoa nut: they are very shy, and take flight so suddenly, keeping among thickets and rotten branches of

fallen trees, that it is very difficult to capture them. Almost all the other interesting groups are very scarce: Buprestidæ, 12 species; Lucanidæ, 1 species; Geodephaga, 12 species; each producing one or two good things, the rest small and obscure.

Having at length, with the greatest difficulty, procured a boat and men, I went to the great island of Aru, in which I visited two localities and remained two months. Here were numbers of species not found on the smaller islands, and I increased my collection considerably. In the Lamellicornes and Buprestidæ, however, I did not get a single new species, almost all my increase being confined to the Longicornes and Rhyncophora. I doubled my species of Tmesisternus, which is quite a characteristic of the New Guinea Fauna, and I was delighted to obtain T. mirabilis, the largest and most beautiful of the group, in tolerable plenty. I also added some nice butterflies to my collection, and at length succeeded in obtaining two nearly perfect males of Papilio Ulysses. Mosquitoes and minute ticks here attacked me so perseveringly, that my feet and ankles refused to submit, and, breaking out into inflamed ulcers, confined me to the house during a month of the very finest weather, when I had hoped to obtain and preserve a host of fine insects, for the incessant rain and damp sea air at Dobbo had rendered it impossible properly to dry my first collections, a great part of which was, I afterwards found, completely spoiled. In no part of the tropics have I suffered so much from damp, or found it so absolutely impossible to preserve my collections, though exposing them to every gleam of sunshine, and even to fire heat, which, however, is of little use in bamboo houses which freely admit the damp air in every direction. Returning to Dobbo I remained a prisoner for another month, before I could again reach the forest. I then worked hard for the remainder of my stay, adding many fine Hymenoptera and Lepidoptera to my collections.

Arriving safe at Macassar, and taking up my old quarters, I had a most fatiguing task,—to open out, clean and pack my collections (more than seven thousand specimens), which occupied my whole time for three weeks. I was now able to ascertain my total number of species in each order, and to determine the identity of many with those described by Guérin and Boisduval from the French voyages. These are very numerous, so much so that I think at least half of the known insects from New Guinea will be found in my Aru collections, which is not a little remarkable, considering that they have been obtained from various and distant localities in that extensive country: for instance, nineteen species of Tmesisternus are known, all from

New Guinea and the adjacent islands. I have obtained exactly the same number in Ké and Aru: ten of these I can identify, the other nine being, I think, new. About twenty other Coleoptera peculiar to New Guinea I can also easily identify, and no doubt many others among the small and obscure ones will also be found to be already known from that country. In Lepidoptera I have four of the New Guinea Papilios, Pieris Celestina, *Bois.*, Satyrus Osiris, *Bois.*, Emesis Leosida, *Bois.*, Damis Coritus, *Guér.*, D. Sebæ, *Bois.*, and four or five other species, besides many beautiful Lycenidæ, which will be, I think, quite new. In Hymenoptera and Diptera I am very rich, having bestowed much attention on these orders. Fifty-nine species of ants, collected in Aru, will add much to our knowledge of the distribution of this interesting family. Of other Hymenoptera there are 155 species, many of them large and fine. The flies contain many brilliant and many curious things, and I am rather proud, amid the attractions of Ornithopteræ, Lomapteræ, and Paradise birds, of having collected 185 species of this much-neglected order; and there are yet, I am sure, many more of moderate size, and hundreds too minute for any but a professed dipterist to attend to.

Deducting the time lost by illness and in travelling, I had about four months' clear collecting; and I think I cannot do better than give a list of the number of species obtained in the principal groups, so that English entomologists may see what a New Guinea island does really produce.

Coleoptera, 572 species, viz.:—

Geodephaga	20	Prionidæ	2
Hydradephaga	3	Cerambycidæ	35
Brachyelytra	6	Curculionidæ	92
Xylophaga, &c.	20	Bruchidæ and Anthribidæ	35
Lamellicornes	18	Brenthidæ	18
Lucani	3	Heteromera	42
Passali	6	Cleridæ	16
Buprestidæ	23	Malacoderma	45
Elateridæ	30	Cyclica	68
Lamiidæ	77	Trimera	13

Lepidoptera, 229 species, viz.:—

Papilionidæ	16	Erycinidæ	2
Pieridæ	12	Lycenidæ	57
Satyridæ	9	Hesperidæ	18
Nymphalidæ	33	Moths	72
Danaidæ	10		

And of the following, 563 species, viz. :—

Hemiptera . . .	80	Orthoptera . . .	18
Homoptera . . .	50	Neuroptera . . .	10
Hymenoptera . . .	214	Forficula, Blatta, &c. .	6
Diptera	185		
Total species of insects . . .	1364		

In the Lepidoptera and Coleoptera it will be seen there is a striking deficiency of species. In both Singapore and Borneo I obtained, in the same time, more than twice as many beetles, while in South America either of the families of Erycinidæ or Hesperidæ far outnumber the whole amount of the Aru butterflies. Such poverty is a great drawback in this otherwise interesting country, and, were it not that there are a few remarkably fine things, and a considerable proportion of the species are either new or very rare, it would not be worth a collector's while to remain in it. There are scarcely twenty butterflies of which I have been able to obtain tolerable series of good specimens. I am now convinced that the number of species of butterflies diminishes from continental India, as you go eastward. In Java and Borneo there are less than in India and Borinah, in the Moluccas and New Guinea still less, and in the Islands of the Pacific scarcely any. The same rule probably holds in Coleoptera, though of that I am not so sure till I have seen more of the country, as peculiar circumstances of station and locality make a great difference in that order.

I should mention that, in the above list, I have included about 90 species of various orders taken in a few days at Ké Island, 60 miles west of Aru. In no part of the tropics I have visited has so much care been required to preserve my collections as in the eastern portions of the Indian Archipelago. Three or four distinct species of ants are ever on the watch for soft insects, which they find out and attack with the most astonishing celerity : two of these are very minute and will *not* be banished. They struggle over water, drop from the roof, and lurk in cracks and crannies where it is impossible to dislodge them ; and again and again have my specimens of minute Diptera and Lepidoptera been destroyed by them. The larger species are more easily kept out, but far more destructive when they do effect an entrance, and they never miss an opportunity. A hanging shelf isolated by oil had kept my drying box more than a month in safety, when one morning I found it swarming with red ants, and several fine butterflies taken the day before being carried away piecemeal. Searching for the bridge by which they had reached my fortress, I found that my Malay boy had carelessly thrown a palm-leaf mat behind the shelf, the corner of which just touched it, and now presented

a double line of entering and returning ants. I called him to see the mischief he had done, and then, putting all right, went into the forest, and had a successful day, obtaining several fine and some new butterflies. At night, before going to bed, I carefully examined all round my shelf, but the next morning the enemy had again entered; again my fine insects were being carried away piecemeal, and I was only just in time to save one lovely and unique butterfly from total destruction: again I searched,—for a ladder I knew there must be,—and found my unlucky boy had again done the mischief: he had been roasting coffee for our return voyage, packed it in a jar, and tied to it a long slender rattan, by which to secure it on board; this he had placed on the floor under the shelf, with other sundries, and the rattan sticking up its extreme point just touched the shelf beneath. One would think the ants must every night explore and wander everywhere, for they never fail to discover even a hanging thread by which to ascend. In no other place have they attacked my birds as well as my insects. In all parts of South America, in Malacca, in Borneo, *they* at least were safe on a table or in a box; but in Macassar and at Aru they are attacked as voraciously as the insects, and even greater precautions are necessary, for the ants establish colonies inside the skins, whence they sally out to devour the eyelids, the base of the beak, &c., and completely destroy the beauty of the specimens. Here, too, it is impossible to keep the insect-boxes free from minute spiders which make webs over and under the specimens, and often gnaw them. Then there are some minute larvæ which attack large-bodied Lepidoptera, mining out their bodies, and reducing them to a mass of dust which dirties every specimen in the box; and lastly are the mites, which the damp sea air of these islands seems especially adapted to develope. Long and sad experience of this pest has convinced me that there is but one preventative, viz. to dry the specimens rapidly, which it is often impossible to do, and then neither camphor, arsenic, nor cajeput oil, have any effect whatever. Add to this that everything must be shut up at night in closely fitting boxes, or the insects will be eaten by cockroaches and the bird-skins by rats, and some little idea may be formed of a collector's troubles in the damp climate of Aru, while living in a half-open bamboo shed, surrounded by his daily increasing stores of beautiful objects, which the most incessant vigilance can hardly preserve from destruction.

ALFRED R. WALLACE.

Notes on Anisolabia maritima, Bon.

By George Wailes, Esq.

In the early part of the past summer Mr. Bold showed me for a few minutes two specimens of what he considered the larvæ of the rare Forficula gigantea, which he had found a few days previously on the sea banks near South Shields, underneath stones at the foot of some ballast heaps he had been accustomed to examine for Coleoptera, and where he took Nitidula flexuosa, as recorded by him (Zool. 5111). I at once pointed out appearances which led me to infer that this was an error, and determined to wait until autumn, when all our Forficulæ complete their metamorphoses and arrive at maturity, and then investigate the subject. Accordingly, on the 22nd of September last, I visited the locality, and soon met with the insects in abundance and of all sizes, and, being well aware how fragile their delicate antennæ were, I took the precaution to collect them into a bottle of spirits of wine. From what I saw upon the spot I was convinced that, although there were no traces of wing covers, I had perfect insects of both sexes, and not merely larvæ, before me, and on my return home in the evening settled the fact anatomically. I was aware that no work on British Entomology contained a genus to which it could be referred, and therefore turned to Burmeister's second volume, as the latest descriptive authority I had at hand, and found that no description or even section would include this species. I forwarded, therefore, a specimen to my friend Mr. Westwood, stating that I expected I had got something new, and his reply was that he had no doubt it was the Forficula maritima of Bonelli and Géné, Forficesila maritima of Serville, and the Anisolabia of Fieber. On referring to Fieber's little work I was satisfied that he had had this insect in view (though certainly mutilated specimens) when he defined the genus, but as I did not then possess Serville's work I could not determine it to be the maritima of Géné; and on again consulting Burmeister, who professes to include the species of Géné's pamphlet, I found not the least allusion to it. Having in the interim added Serville's book to my library, I observe the species very well described. According to Géné it is widely diffused, at the end of spring, along the shores of the Mediterranean, Genoa, Nice and Tuscany, under stones and cow-dung, though it would seem not to be confined to the sea-shore, as Serville mentions it to have occurred on Mount Lebanon, and Fieber adds Sardinia and Sicily and South Carolina to its habitats.

Having collected a considerable number of specimens, in all stages of growth, I have been induced to examine them, with a view of assisting to clear up certain points, which appear to be yet unsettled, as to the metamorphoses of this curious family of insects. The result I now give.

I may premise that even so late as the end of September there were specimens in apparently their earliest stage, and just disclosed from the egg, as I took one not more than two lines long (I speak *exclusive* of the forceps in these notes), which Mr. Westwood gives as the size of the corresponding stage of F. auricularia. In this state it seems to agree with that insect in having only eight joints to the antennæ, of which the second (as in all its future stages) is the shortest, and the third the longest, except the basal joint. The remaining five are of nearly equal length; the fourth is similar to the third in being smoother than the four last, which are of the same shape and densely pubescent, as in the terminal ones of all the future stages. The palpi consist of five joints as in the imago, and the prothorax, mesothorax and metathorax have all the shape and are as fully developed as in the perfect insect. The head and eyes are large, the latter black and prominent. The abdomen consists of nine segments both on the upper and under sides, and the integument is very soft, of a pale brown colour, with the apical segment of the abdomen and the forceps nearly transparent. The latter has the straight form of the female insect, and the tips slightly curved. The scattered hairs with which the perfect insect is furnished, both on its upper and under surface, are also present.

In what I take to be the next stage the length has reached $3\frac{1}{4}$ lines. The joints of the antennæ have increased to sixteen; the additional ones have assumed something of the various proportions they are henceforward to bear. They are evidently developed after the third joint, and probably at the expense of the fourth one of the first stage, as the four terminal joints still retain their former shape and dense pubescence. The segments of the abdomen are nine as before, and the forceps continues of the previous shape. Towards what may be termed the latter period of this stage the integuments assume the pitchy brown colour and nearly the consistence of the perfect insect.

On what is apparently the next transformation the insect attains the length of from 5 to $5\frac{1}{2}$ lines. The antennæ contain twenty joints, though from this period the "wear and tear of life" renders it very difficult to ascertain this precisely, as from their extreme delicacy the point of junction can scarcely be seen even through a good lens; and

in very many cases the two antennæ differ in this respect in the same individual. The number of the segments of the abdomen remains as before, and the forceps has undergone no change except an increase in size.

In the next stage, when the length varies from $6\frac{1}{2}$ to 8 lines, the first faint indications of sex appear. The antennæ have now reached twenty-two joints; indeed, one specimen (an incipient male) had twenty-three joints in one and twenty-two in the other antenna, of both of which the terminal joint was *certainly* perfect. The number of abdominal segments in all the specimens still continues to be nine, but the forceps, in such as I presume are to be developed as males, has become much thicker at the expense of its length, though the basal tooth possessed by the mature insect is yet wanting. The whole of the specimens have during the last two changes so completely assumed the colour and appearance, and in many examples even the size, of the perfect state that at first sight they might readily be mistaken for small mature females.

On the final change there is no longer any doubt of their maturity. The antennæ of two or three specimens, out of probably a hundred, I have ascertained to consist now of twenty-three joints, but I think this is not the maximum when really perfect, for the apical joint in one or two instances bears *certain* marks of not being the terminal one when submitted to a powerful compound microscope. A considerable number of my specimens possess twenty-two joints in one or other of their antennæ, but the bulk of them range from twenty-one to nineteen, and many even fewer. These have all undoubted traces of mutilation. As before remarked, they are not seldom dissimilar in the same insect. Fieber gives seventeen as the number; Serville says, "more than twenty." The antennæ may be described as filiform, or tapering very gradually towards the apex. The first joint oblong-ovate, narrowed at the base, as long as the second, third and fourth taken together, rather smooth, with a few scattered hairs; the second very short, almost quadrate or even transverse, slightly pubescent; the third elongate, not quite so stout as the second and three times its length, and, like the twelve following ones, slightly contracted at the base and pubescent; the fourth short, but rather longer than the second; the fifth short, a little longer than the fourth; the sixth and following six or seven gradually increasing in length, after which the remainder are linear and as long as the second and third united, and the terminal ones very closely and very densely pubescent. The abdomen of the male still retains the nine segments, and the forceps has

become greatly curved, so that the two points overlap each other, forming a ring when closed, and having a strong tooth at the base on each side. In the female the abdomen now *apparently*—for Mr. Westwood has clearly demonstrated that it is only in appearance—consists of seven segments above and only six beneath, and the forceps retains its simple elongate form, having the internal edges slightly crenulated by a row of impressed dots along the edge, whilst the hook at the apex becomes a little more curved.

I cannot be sure that the above are all the changes these insects undergo, as that can only be clearly settled by rearing a single brood from the eggs, and tracing them up to maturity; but I believe I am correct, as all the specimens readily corresponded, both as to size and the number of joints in the antennæ, where perfect, with some one or other of the above stages of growth.

These observations appear to me to solve the question as to the period at which the change in the visible number of the segments of the abdomen, amongst the Forficulidæ, takes place; and although there are certainly faint indications by which the sexes may be distinguished in the penultimate state, yet I think we may safely conclude that, so far as those insects are concerned, no propagation takes place until the ultimate stage is reached.

I may now say a few words as to the locality in, and the circumstances under which the insect occurs with us. Every one who knows the Tyne is aware that it is an exporting port, and in return for the coals we send away we receive the stones, gravel and soil of almost every part of the globe, in the shape of ships' ballast, and in such quantity that huge mounds, of the aggregate length of several miles, may be found piled up forty or fifty feet high along its shores. It is at the base of one of these mounds, containing many millions of tons, which has been in the process of deposit for several years past, and abuts upon the sandy sea-shore, although far above high-water mark, that the insect is to be met with in great abundance, underneath the stones, vitrified scoriæ from the glass and alkali works, &c., which roll down from above and rest upon the bare sand. I have noticed that it very frequently clears out for itself cells in the sand underneath the stones, as the common earwig does, though, as might be expected from the lateness of the season, I did not observe any appearance of the females brooding over their young, or having them gathered around them as we constantly see in our native species. I am fully persuaded that this inhabitant of more southern climes is not truly indigenous, but, being peculiarly fitted

for a long sea voyage, and finding itself landed on a favourable spot, it has, like many other insects and plants, become perfectly naturalized amongst us. Can this be the way it has reached South Carolina?

I may further add that so late as the 13th of November it was, including specimens of three lines' length, in full activity, whilst our common earwig is dormant, proving it quite capable of bearing our northern climate, which doubtless it has done for several years past.

GEORGE WAILES.

Newcastle-on-Tyne,
November 19, 1857.

A Proposal for a new Catalogue of British Coleoptera.

By J. W. DOUGLAS, Esq.

THE Entomological Society of Stettin has recently published the sixth edition of the 'Catalogus Coleopterorum Europæ,' or Catalogue of the Coleoptera of Europe. This publication serves the coleopterists of Europe as a guide for naming and arranging their collections, and is used also for facilitating exchange of specimens. That it is not complete or entirely accurate none know better than the compilers, for each succeeding edition contains additions to and emendations of its predecessors; but notwithstanding its imperfections it is accepted as the best thing of the kind procurable, and is found to answer all practical purposes. The best thanks of entomologists are accorded to the Stettin Society, under whose auspices and at whose cost this Catalogue is brought out and sold at the price of sixpence per copy, thus placing it within the reach of every one.

Now, it does seem strange that, while we have a Catalogue of the Coleoptera of Europe, we have not one of the Coleoptera of Britain. It might have been supposed, seeing the species found in Britain are, with few exceptions, common to the Continent, that it would be easy to select our natives from the European list; but, unfortunately, the nomenclature hitherto used in this country differs materially from that accepted abroad, so that to a great extent we cannot recognize our species under continental names, nor can continental entomologists understand what species are intended to be indicated by our English names. The difficulty is further increased by the fact that we ourselves are often unable to tell any better than a foreigner what

our species are, for a variable species often figures under a dozen different names, and foreign descriptions have been translated, and, with the names, applied to insects to which they do not belong. To disentangle this web of synonymy is no easy task, and is necessarily a work of time: some of our best coleopterists have applied themselves to it, and are still engaged upon it, and we may eventually have our lists in accordance with those of the Continent.

But in the meantime the want of a cheap compendious Catalogue of Coleoptera is a great drawback to collectors in this country. I do not say this without reason, or merely from my own experience, for I have had many letters pointing out that the writers cannot accept offers of species not British, because they cannot inform their correspondents abroad what species are natives of our island, and also that the arrangement of their British collections is retarded. I know it is said that many persons think too much of making collections, and it is true; but if we assist them in so doing we shall all have more material to work on for elucidating the natural history and geographical distribution of species, and perhaps induce the persons in question to become something more than collectors.

The thing that requires to be done in the present stage of affairs, and pending the investigation of synonymy in those families where it has not been revised, is, that those persons who have specially studied the several families should mark off the species in the Stettin Catalogue which they know to be British (and I believe that to more than one such a work would not be difficult), filling up the gaps where all are at fault with Stephens' names, and take the list thus prepared as the beginning of a new British Catalogue. Synonyms need not be added, because part are already given in other works; the remainder would follow, and collectors would soon learn to what species the names adopted were to be applied. Such a work I have reason to know would be received with favour, notwithstanding its faults, and in a year or two we should be able to bring out another edition correcting many of the errors. This is the course that was pursued with the British Micro-Lepidoptera, and the result is that within a few years we have assimilated our nomenclature to that of Germany, and no longer stand in isolated ignorance. There is no cause to doubt that those most capable of doing the work will give the requisite assistance; nor can I for a moment entertain the idea which has been started, that there are persons who would like to see it done only for the pleasure it would give them to cut it to pieces and show its errors. But, doubtless, if such a course were pursued it would

be beneficial to us, although the spirit that dictated it would be very mean.

This work is one that the Entomological Society would do honour to itself in performing; indeed, it was once proposed to be done under its sanction, but was taken out of its hands by an offer to produce a more complete Catalogue, which, however, we all now fear is not likely to be soon accomplished. But, as large bodies are slow to move, and there may be an unwillingness that the Society should countenance a work confessedly incomplete, it may come better from private hands. After all, I think it would be found that the knowledge possessed by such proficients as Dawson, Clark, Janson, Waterhouse, Wollaston, Power and others, if united, would leave comparatively little to be desired.

To recapitulate:—It is required that, taking the Stettin Catalogue as the basis, a Catalogue of the British Coleoptera, without synonyms, should be prepared without delay, and published at such a low price that every one interested could buy several copies, so as to secure the promoters from loss. The good work of revision, so well begun by several persons, could still go on; in a year or two another edition would be called for, and after a repetition of the process, as in the example of the Tineina before quoted, we should have a list worthy of the name of a Catalogue of British Coleoptera.

J. W. Douglas.

Lee, November 30, 1857.

An Entomologist's Visit to the Diggings.

By T. J. R. Oxley, Esq.

Influenced partly by the love of gain, and partly by an insatiable desire of collecting insects previously unknown, I determined, immediately after the loss of an only parent, to visit the gold diggings of Australia. Taking with me three assistants, I left Gravesend on the 14th, and Plymouth on the 20th of May, and sailed for the El Dorado of the antipodes. We had an average passage, the weather being generally favourable. One serious incident occurred, which I may be excused for mentioning: when near the equator we came into collision with a homeward-bound ship, and ran some risk of going to the bottom. On the hundredth day we anchored off Williamstown, and a few days afterwards landed at Melbourne.

On the 7th of September I started, with my three assistants and several shipmates, for the Diggings: we left Melbourne on foot, and, the roads being excessively muddy and slippery, we found that mode of progression painful and laborious in the extreme. At Keilor we came to a river, which we crossed in a most antediluvian-looking punt, and passed the night in wet clothes on the stone floor of a hut: on the 8th we crossed Keilor plains, then a regular sea of mud and water, keeping in sight a most picturesque-looking mountain peak, which rose many miles distant on the south-west. We passed close to some remarkably deep water-courses on the right, and particularly noticed a curious little conical hill, covered from its summit to its base with honeycombed boulders, the substance somewhat resembling pumice stone, but being much heavier. We reached Aiken's Gap at night, after a most fatiguing walk of fifteen miles, and there at last found ourselves in comfortable quarters. During this wearisome journey I observed hundreds of large caterpillars at rest on the blades of grass, or devouring them. A croaking or chirping sort of noise was heard throughout the day: it seemed to proceed from the innumerable little pools of water which lay in our course, and we attributed it to the frogs, but of the truth of this explanation we had no evidence.

On the 9th we set out for a coffee-house near Mount Macedon, a distance of seventeen miles, most of our course laying through the Black Forest, in passing through which we observed thousands of gum trees lying on the ground, deformed and charred by a fire which had swept the whole country, in February, 1849, on a day which has since been called Black Thursday: thousands of others, of all sizes and ages, which had escaped the conflagration were still standing. In the midst of rain, and ankle deep in water, we lost the track, and, in our attempts to regain it, walked in a circle for hours, fording a small river five different times. At last we reached a shepherd's hut, where I left most of the party, and pushed on with an old friend to his home near Mount Macedon, which we reached at length after a walk of twenty-five miles. At night when I pulled off my boots the skin of my heels came with them, and inflammation followed on this, which made it impossible to proceed. We took up our abode in the remains of a shepherd's hut, which was sufficiently roofed to keep out the rain. We spread Eucalyptus leaves on the ground, and, covering them with blankets, made ourselves beds, and used logs of wood for pillows. The fatigue we had undergone, combined with the bad water, bad mutton, and other bad things we got at this place, caused dysentery,

which brought us all very low, but from which we eventually recovered.

Whilst staying here I contrived, with the aid of a staff, to hobble from tree to tree, and amused myself with observing the curious Coleoptera which the sun, when it shone, tempted from their winter hiding-places. One of these, of the genus Amarygmus, one of the Heteromera, with brilliant metallic shades of green and purple, was peculiarly beautiful: the beetles of this genus I afterwards found everywhere; they are common all the year round.

We were not long in Australia without finding that the climate was very peculiar, days of soaking rain being followed by frosty nights, which often cover the pools with ice half an inch thick. Three hours after sunrise all this would be melted, and the temperature would become so warm that exercise would produce a profuse perspiration. In the morning I used continually to start up, from the wet or hoar-frosted grass, lepidopterous insects, particularly beautifully marked Geometræ, and I was both pleased and amused to observe how much the colours and markings of some of them resembled those of our English ones. A small blue Polyommatus, which had survived the winter, was also plentiful. Birds were most abundant, although thousands of gold diggers had passed and repassed the place where I was staying: they were mostly of the parrot tribe, and were remarkably tame; numbers of magpies and laughing jackasses would come within thirty yards of me, and the beautiful satin bird would actually come into the hut and pick up its food while I was sitting by the fire: this occurred several times, and on one occasion two of them came in company. I may here make a general remark, that the birds and animals of Australia appear much more readily tamed and domesticated than with us, being readily reconciled to captivity, and evincing such attachment to man as really to induce the conclusion that they prefer an artificial to a natural state. I saw many cockatoos shot, and always regretted to see such lovely birds destroyed for so little purpose: it must, however, be said that they are excellent eating.

I had an opportunity of examining a laughing jackass, holding it in my hand and observing its peculiarities: it lives on reptiles, and nothing could be better adapted for this kind of life; it has scarcely any flesh, its body being remarkably light, and so thickly covered with feathers that it seems almost all feathers; there seems nothing about it that a reptile could bite; its beak is very large, pointed, and enormously strong, and with this it will seize a large snake, and, regardless of its writhings and attempts to bite, will rise high in the air,

and, letting its prey fall from a height that is always fatal, it will then descend and make an undisturbed meal of its senseless victim: on contemplating this bird, I was particularly struck with the wisdom that had created a form and powers so admirably adapted to its mode of life. The neighbourhood in which I was living abounded in the diamond snake, one of the most deadly of reptiles: on the 16th of September I assisted in killing a large female of this species, four feet in length and as thick as my arm.

On the 23rd we bade adieu to Mount Macedon, and turned our faces towards Mount Alexander. After emerging from the Black Forest the country ascends gradually for forty miles, and consists of a series of hills and dales. The geological formation of the hills is sandstone (not trap) and slate in alternate strata, here and there intermixed with a stratum of milk-white quartz. Indeed immediately after leaving Melbourne, and all the way to the Diggings, you continually meet with fragments of white quartz whichever way you turn. The country is generally wooded with the various species of Eucalyptus: they are ungraceful trees, but often grow to a height of eighty or a hundred feet. The yellow wattle, a species of Acacia, is a beautiful tree, covered with a profusion of golden blossoms smelling most fragrantly. Wherever we went the flowering Epacris attended our footsteps, reminding us, by its heath-like appearance, of our distant home. A small bright yellow Narcissus was also common, opening its delicate petals to the vernal sun.

A few days after leaving Mount Macedon my companions and I had each paid our thirty shillings license, and had become veritable gold-diggers, making our *debût* on Moonlight Flat or Gully, Forest Creek, and Natural History at once became a secondary consideration; still I never omitted an opportunity of admiring the beauties of creation, and of adding to my collection of insects.

About the middle of October the weather became settled, and the sun intensely hot. Insects of course appeared plentifully, more especially Coleoptera of the longicorn genus Phoracantha: these, flying at sunset, had the most curious appearance, from the great length of their outstretched antennæ. A large moth, an undescribed species of Ommatophora, was very plentiful in October and November, but always in bad condition. A species of the genus Plusia was also very common, and whenever I walked through the dried-up herbage, in October or the beginning of November, numbers of drab-coloured Noctuæ would start up before me.

During the month of November I observed many beautiful species

of Papilio, Polyommatus, and other Lepidoptera, but I had no means of taking them; and this, together with the want of pins and want of time for setting them, caused an almost total cessation of collecting; nevertheless I continued to observe. On the 11th of December I had the good fortune to witness one of the most extraordinary flights of butterflies that was perhaps ever seen; they were all of one species, Pieris Teutonia: from sunrise to sunset the atmosphere seemed literally filled with them; before you, behind you, right and left, they were passing by hundreds of thousands: they came from the south, and flew directly against a northerly wind. I caught a few in my hat, sufficient to ascertain the species. For two following days they continued to pass in the same direction, although in diminished numbers each day. The rate at which these butterflies were flying was about seven miles an hour, and the flight extended, as I was afterwards told, many miles both to the right and left of Forest Creek.

From December to March I saw many insects, of all classes, that were new to me, but having no pins (I had lost them in the Black Forest) I collected but few. Had it not been for this misfortune I might now have made a good collection of Micro-Lepidoptera. In March I deemed it prudent to return to Melbourne to lay in a stock of provisions for the winter.

I left Melbourne on my return on the 1st of April, in company with a shipmate who owned a horse and cart, and pitched my hut on Forest Creek on the 6th. On this journey I captured several specimens of a very richly marked insect, the Agarista Callisto: as we travelled along these beautiful creatures would start up from the cart-ruts or clods of damp earth. On camping each night we made a roaring fire of cow-dung, and boiled our water for tea; then sat by the fire, smoking our pipes before turning in under the cart, where the ground served us for a bed. Many insects sacrificed their lives in the fire, and I captured while approaching several mutilated specimens of a new beautiful and most remarkable Bombyx, which Mr. Newman has since named Teara denticulata. On this journey we observed also myriads of a small and unnamed lepidopterous insect, probably a Crambus, which, on our lighting a candle under the cart, swarmed into it in such numbers as actually to extinguish the light; and many a time have I found it absolutely necessary to clear away their dead bodies from the wick with a lucifer match, or it would have been quite impossible to keep the candle alight. Before we retired they would fly by scores into the scalding tea, and as they floated lifeless

on the surface, with outspread wings, I have often thought what a model for setting they presented to the entomologist.

As the autumnal months, April and May, advanced, insects became less plentiful, but did not entirely forsake us. The Lepidoptera were of smaller size, and many Micros used to come into our canvas tent at night, probably to shelter from the cold. In May, June, July and August we had many frosts: the ice, however, invariably melted before the following noon. During this season I found many beetles in pools of water, and also Lepidoptera, many of them closely resembling in colour our dark brown autumnal insects.

In July I removed to Barker's Creek, which in a few weeks resounded with the unceasing croaking song of innumerable frogs. In August and early September the gully was beautifully brightened by the golden blossoms of the wattles, which were three weeks earlier in flower this year than in the preceding one.

With the first burst of vernal vegetation, in August and September, new insect forms appeared, so curious and so beautiful that I could not resist the temptation to collect, but all my pins were gone; what could I do? I hunted over the collection I had made, and when I found more than two of a species I stripped them off the pins, and used the pins a second time for the novelties. By this means I managed to secure many new species, although for the same reason I kept only a single specimen of each. Several lovely Micros were thus preserved; they were mostly found settled on low and insignificant plants.

In October the slopes of the ravines were a blaze of bloom. Woody and stick-like trees and shrubs of the genus Casuarina, which at no period of the year bore anything worthy the name of a leaf, were now a mass of the most dazzling inflorescence. From October to the third week in November is the best season both for plants and insects at this locality. In Specimen Gully, about a mile from my tent, I saw more species than in any other spot throughout the Mount Alexander Ranges, and here I captured some of my most lovely insects.

On the 12th of November I received a packet of pins from England, which gave me much delight, and I found them of great service during what little remained of the entomological season. I would gladly have given their weight in gold to have had them six weeks earlier, but the bloom soon after left the ravines, the trees and shrubs resumed their stick-like appearance, the herbage was dried up and scorched beneath a burning sun, and day after day the sky was without a cloud. Collecting insects became a labour not unattended with danger. In

pursuing some bright insect over rocks and bushes, you ran great risk of setting your foot on some deadly snake, or perhaps on a bunch of snakes holding connubial conference. I trod on one most venomous species whilst vaulting over bushes in chase of the beautiful little Pollaclasis viridipulverulenta, one of the Anthroceridæ, so like our Procris Statices as always to remind me of that familiar species.

During the hot weather I observed a dipterous insect with habits so singular that I cannot refrain from relating them. The size was that of one of our largest female bluebottles, but the colour totally different, the Australian species being banded with the brightest golden yellow: often while searching among the scrub, in Launceston Gully, have I seen a pair of these flies "locked in love's embrace," basking in air in the burning rays of the sun. A moment would they seem to rest, poised motionless: they would then rock to and fro, describing the lower half of a circle and returning in the same track, both pairs of wings vibrating in unison and flashing in the sun. On my attempting to net them, off they would dart, still united, but would halt at a very short distance, then hang for a few moments again motionless, and again commence their pendulum-like vibration as before. Although no dipterist I made many attempts to secure this beautiful and unknown fly, and once succeeded in getting a pair into my net, but one of them escaped before I could secure it, and the other alas! was afterwards accidentally crushed and completely annihilated.

In December, corresponding to our June, vegetation appeared paralyzed: trees and shrubs continued to grow, but nowhere is seen that luxuriant vegetation which the fields, woods and hedges of England exhibit during the summer. Australia does not produce that vividly green and succulent vegetation which is so beautiful with us: the vegetation, too, is very monotonous and unvaried. I have wondered how so small a variety of plants can produce so great a variety of insects: the larvæ, even of the Lepidoptera, feed much in the stems of the grasses and in the bark and wood of trees; indeed the gum trees, the wattles and a few grasses seem to bear the entire onus of supporting insect life. I have observed, also, that insects are of less regular appearance than with us. Although at the close of 1853 and beginning of 1854 there were thousands of species, they were not nearly so numerous in individuals as twelve months previously, and many species would be excessively abundant one year that were rare or entirely wanting at a corresponding period of the next year. The influx of diggers, the felling of hundreds of thousands of trees, the frequent

fires in the scrub and grass, the upturning of acres of bushy and grassy land, may in some measure account for this, for by these causes myriads of insects must be destroyed. As agriculture succeeds to gold-digging, and profitable crops take the place of worthless scrub and grasses, we shall perhaps lose many local species which are now abundant. I recollect that Mr. Dickson told me this was the case with heaths: many beautiful species, each confined to a very limited locality in its native country, at the Cape, are now found there no longer, the demand for sale, together with the extension of building and agriculture, and the species not being capable of successful propagation here in England, having caused their extermination. Every one of these had perhaps an insect depending on it for support, and with the heath has perished the insect. In all probability this will be the case in Australia, where the species are excessively local; and most earnestly do I exhort our entomological brethren to describe and figure all they can, while yet they have the opportunity of doing so.

I made many attempts at breeding Lepidoptera, but succeeded only with a few Bombycina and a few dozens of a very abundant Thecla, the larvæ of which I found full fed: most that I got turned sulky and would not eat, and so died. One larva, which I never succeeded in rearing, particularly attracted my attention: I found it feeding nearly all the year round, and appearing gregarious, for I sometimes found them twisted together in masses as large as my hand, but generally there would be perhaps a dozen in company: their colour was nearly black, tinged along the sides with a dusky dirty yellow: when disturbed they would jerk up the head and tail, ejecting a thick filthy yellowish fluid from the latter. But the great singularity of the creature was that each would turn its head towards some one of the four cardinal points: out of a dozen perhaps three would jerk up their heads, and hold them exactly facing the south, three others would point them to the north, three to the west, and three to the east, the four directions of pointing being at right angles; the tails after a while would resume the horizontal position, and seem to become entangled and intertwined with each other, the whole party forming a most remarkable figure. Whether this is for warmth, or for coolness, or for protection from ichneumons, or for love of one another, or because they cannot help it, I am unable to say; but it is a sight worth seeing. [Mr. Davis has described a similar larva, but has not noticed its pointing to the cardinal points, which may possibly be accidental;

the pointing at right angles is, however, described as invariable: it is the larva of a large short-horned sawfly, Perga bella.]

During the summer I frequently found a forbidding-looking carnivorous beetle, velvety black with white spots: it runs over the trunks of trees, and is especially fond of prying into the crevices of the bark, seizing and devouring every insect it can find: its voracity is boundless. Often on lifting up a piece of loose bark I have found it fastened on a poor longicorn thrice its own size, and eagerly engaged in devouring its inside while the poor creature was still living: common as was this sight it always reminded me of some poor antlered stag in the death-grip of a wolf or deer-hound. Vain are the struggles of the poor Cerambyx when once this creature has fixed its formidable jaws in its thorax or abdomen. I have often found on the ground, or in the pools, the splendid Lamprima reduced to a mere shell by this savage enemy, and dropped from high up the trunk of a giant Eucalyptus.

I spoke of the enormous flight of Pieris Teutonia which I witnessed in 1852. I looked in vain for a similar phenomenon at the same period of the following year; two or three specimens at a time were all that I saw. The number of butterflies, that is of species, seems small in proportion to other insects, and these by no means handsomer or more brightly coloured than European species. The Noctuina are inferior to our own; there was nothing so beautiful as our Thyatira batis and derasa, our Aplecta herbida and Miselia aprilina, but the Bombycina were more beautiful, and the Micro-Lepidoptera far surpassed ours both in size and brilliancy of colours. I captured many that were previously unknown to Science, particularly of the genus Œcophora.

The Coleoptera are for the most part new, and often very handsome species: besides those I brought home I found the beautifully marked elytra of others floating in the pools, the perfect insects never having been found alive. I think the short twilight, the rapid transition from day to night, renders it difficult to find many of the species, both of Coleoptera and Lepidoptera, alive. I was particularly struck with the extraordinary manner in which the feet of many of the larger weevils, Curculionidæ, are cushioned or padded: this is evidently designed to enable them to walk over the trunks and branches of the smooth-skinned Eucalypti. I shall never forget the exclamation of one of my assistants when I pointed out to him this curious structure: "I'll be hanged," says he, "if the beetle has not got pattens on."

Several times I tried sugaring for Lepidoptera, but never succeeded.

I could only persuade one small species of Tineina to patronize my labours. I tried to account for this in the fact that the smooth bark of the gum trees, patrolled incessantly by large ants, does not offer the same inviting footing as our rougher barked oaks and other timber trees. I have often tried beating, and succeeded poorly with Lepidoptera, better with Coleoptera,—the young wattles, Eucalypti, and other less leafy trees, affording poor shelter for Lepidoptera, but being much frequented by Coleoptera. Entomologists at home who hear of the capture of novelties abroad feel a longing to partake of the excitement, but, if I except the gratification of finding novelties, I may truly say that I have found more pleasure in one day's collecting at dear old Darenth than in all the collecting I ever had in Australia. The interminable sameness of ungraceful trees and scrubby bushes; the tiresome walking over barren rocks, or in dried-up water-courses, destitute both of flowers and grass; a temperature of 120° or 130° in the sun; clouds of dust; myriads of annoying Diptera; the glare of light reflected from white quartz; and the imminent peril of treading on poisonous snakes, are the inevitable concomitants of collecting in the summer. To this must be added the fatiguing life of a gold-digger and the listlessness caused by sleepless nights, the result of attacks from countless fleas. When I had boxed a few insects and returned to my tent I was so worn out that I had no heart to kill and set them, but laid down and smoked until it was time to turn under my opossum rug, and then came the fleas!

On the 21st of December we moved to Campbell's Creek, a distance of seven or eight miles; it was an old digging-ground, and therefore a poor spot for Entomology. However, I obtained many Buprestidæ and a few brilliant species of Œcophora, despite the bad locality. About twenty yards from my tent were some dozen young wattles, three feet high, and two or three bushes of Eucalyptus: they were on an arid flat, with little or no other vegetation within some hundred yards, yet here I took better insects than in any other locality, one of which, a Micro, the Boydia criniferella of Newman, I cannot help describing. One evening in January I saw in the dusk an insect quite new to me; it was sitting on the smooth bark of a gum tree, one pair of wings (the hind pair) having the costal margin ciliated in the most extraordinary manner; the fore wings were in motion, vibrating and beating the air in a very curious way. After continuing this motion for several seconds the insect would start off, and run with great speed, but stop at the distance of a few inches, and then vibrate its fore wings as before. When at rest the costal margin of the hind

wings projected beyond the costal margin of the fore wings, as in Gastropacha Quercifolia, and the wonderful fringe of cilia could be seen to great advantage. I saw about half a dozen specimens of this novelty on the same evening, but never saw it before nor since, as many ants were prowling up and down the tree, seeking what they might devour; and it occurred to me that this motion might be employed perhaps in connexion with the wonderful cilia, as a means of obtaining information of one of these deadly enemies: the fringe, however beautiful in structure and extraordinary in length and situation, has doubtless its peculiar object in the economy of the creature.

And now that I have ants in my mind I must have my say about them also. They are the most common insects in Australia, being absolutely everywhere. I have seen in Australia the largest and the smallest ants that I have ever met with: the largest are fully an inch in length, and furnished with the most formidable mandible; their bite is severe and most painful. I was told before I left England to search the ants' nests of Australia for Clavigers and other myrmecophilous beetles: I tried the experiment once, but was compelled to retire before the thousands of active and courageous insects rendered furious by an invasion of their home. "Ah!" thought I to myself, "if Sam Stevens wants Australian Clavigers he had better come here and hunt for them himself." If you stop even for a minute to look over the bark of a tree, ten to one but the ants run up your boots and trowsers in the most aggravating manner, for their homes are almost invariably at the foot of trees. They are excessively pugnacious, and jealous of an intruder on their territories. I have often seen one quietly descending a tree, when, on coming nearer than he approved, he would stand out horizontally from the trunk, clinging by his hind legs only, and in this position would snap at me with his huge mandibles, and spar at me with his fore legs just like a pugilist. They are real plucky creatures, and seem to have sense and discrimination, for although they walked about my tent by hundreds, and ran over my face day and night, they never molested me while there. Sugar is the great attraction to them. I kept mine in a tin box, and, despite my care in keeping it covered, they would sometimes get at it and have a rare feast, but on my entering the tent they would scamper off in all directions, as though self-convicted plunderers. I said then, and believe it now, that these ants knew me, and knew that the tent belonged to me. If bees know their master, why should not ants know a particular individual? They knew they were not at home; they

knew they stole my sugar and that I did not molest them, and, except as regards petty larceny, they never molested me.

In December that beautiful hairstreak, Thecla Evagoras, comes out everywhere: it is of a most lovely metallic-blue colour, and has a graceful but rather feeble flight. The caterpillar is gregarious. I have often gathered a twig of wattle with forty or fifty of the pupæ attached to it, and unchanged larvæ still feeding amongst them; but I allude to this butterfly solely with the view of mentioning, in connexion with it, a peculiarity of the ant tribe. The first batch of Evagoras pupæ that I found was on a little conical sprig of wattle; at the base of the pyramid were a number of the reddish black pupæ glistening in the sun; above these were others, still undergoing their metamorphosis; and at the apex were larvæ still feeding. Hundreds of black ants were bustling about in this colony of butterflies, and I supposed at first their object was to devour the soft and newly-changed pupæ, but this was not so. I found that the skins of the larvæ, immediately after the change, remained tightly adhering to the tail of the pupæ, and that the pupæ had no power to get rid of them. The ants ate this skin only, stripping it off, devouring every particle of it, and leaving the polished chrysalis glittering in the rays of the sun. These ants appeared to delight in running over the backs of the still feeding caterpillars, but never did them the slightest injury. I picked many of the twigs covered with these colonies, and, bringing them into my tent, found the ants most unwilling to leave their companions: however, they did not like the absence of sun, and one by one took their departure. The larvæ continued to change, the skins still adhering to the pupæ. In a few days the butterflies began to appear; those from the pupæ cleansed by the ants were bright and beautiful, the others with crippled wings and unable to fly: this might have been occasioned by the diminished light within the tent, but I could not help attributing it to the want of the kind attentions of the ants.

If any insects in Australia can dispute numerical supremacy with the ants it is certainly the flies, the various species of Muscina; one in particular, somewhat smaller than our bluebottle, is a dreadful pest. It breeds in the offal which abounds at the Diggings, and is perpetually buzzing about you, especially when eating: it settles on your face, and even in your eyes, and you have a hard task to protect your meat, cooked or uncooked; it will settle on it the moment it has cooled, and deposit its masses of eggs, which almost immediately become maggots: some even say it deposits living maggots, but this I

assert from observation. In December and January they give way to a smaller species that is still more troublesome: they come in clouds and follow you incessantly, not to bite, but to suck moisture from your lips, your eyes, or wherever it is to be obtained. Many of the diggers wore veils, others bound little twigs of Eucalyptus before their eyes; but the best remedy is to smoke perpetually during the sunshine: they appear to have a deep-rooted aversion to the weed. I can scarcely distinguish this species from the common house fly (*Musca domestica*) of England. These last till March, when another fly assails you, called the March fly, a species of Tabanus, a dull sleepy-looking insect, that bites severely, instantly drawing blood from man or beast; but these are not so numerous and therefore not so formidable as the smaller pests. Before I conclude these remarks on flies I must add that sore eyes and ophthalmia are common complaints in Victoria. I have observed hundreds of people with one or both eyes so swelled that they could not see. The dropsical-looking eyelids are puffed up on a level with the cheek and forehead: this is called having the blight; it is usually attributed to flies, but with what truth I am unable to say. I observed that men with large or humid eyes were most liable to this distressing complaint.

Among the Lepidoptera of Victoria a green Geometra, closely allied to an English one, was of common occurrence. Many Noctuæ that I should have thought nocturnal flew in the hottest sunshine, and the beautiful species of the genus Synemon, now arranged as one of the Heterocera, flew about all day as merrily as any of the butterflies, and rested at night with erected wings. The new and unique Teara Guenéi of Newman, one of the most lovely and remarkable of its tribe, I caught on a hot day in November, about 2 o'clock in the afternoon, after a most severe chase.

I had not long been in the country before I observed, lying about at the foot of a gum tree, several little oval objects, which I at first supposed to be eggs fallen from nests among the branches above, but on touching them I found they were attached to some substance, as the bark of the tree, or to a twig or a blade of grass. On examining them I found a case or cap had invariably been pushed off one end, and I then concluded they were the cocoons of a Dipteron. At last I found one entire, and, having opened it, I discovered they were lepidopterous. Incited by this discovery, I searched diligently for more, and succeeded in obtaining several. I took them with me

down to Melbourne, where a beautiful female made its appearance, and to this Mr. Newman has since given the name of Pelora Oxleyi. It is wonderful how so large a moth could be contained in so small a cocoon. Another Bombyx, Entomela obliqua, is a sackträger; I have often found the larvæ carrying a most beautiful case, composed of the twigs of Eucalyptus, but have been unsuccessful in all my attempts to breed a perfect imago.

As I am now bringing my memoranda to a close, I will just state that on my return I placed my collection in the hands of Mr. Newman, who felt so much interested that he selected and described thirty novel or unique Lepidoptera in his usual lucid and erudite style. The paper is published in the 'Transactions of the Entomological Society of London,' and is accompanied by figures, beautifully coloured, by my esteemed friend Joseph Standish. The first species described by Mr. Newman, Zeuzera Duponchellii, I found in January, 1854, at rest on one of the wooden legs of my windlass; I borrowed a large pin, and at night managed to convey him to my tent. Cheimabacche Cinderella I took at Barker's Creek, in November. Of Tortricopsis Rosabella I saw four or five: this insect is particularly interesting as belonging to a group, not uncommon in Australia, which seems exactly intermediate between the Tortricidæ and Tineidæ. Many of the insects described in Mr. Newman's paper were unique or extremely rare, but I could not avoid a feeling of great disappointment when that gentleman returned the collection to me with all the Geometræ, which were the gems and my especial favourites, unnoticed and unnamed. On my asking Mr. Newman why he had left the best and most beautiful insects unnamed, he immediately replied, "M. Guenée is now engaged in describing the Geometridæ of the whole world, and I will leave to him the undivided honour of naming these lovely insects."

In February, 1854, that success which had previously eluded me in the gold field began to set in, and Entomology again fell into abeyance; still I never left the tent without my pill-boxes, and rarely returned without some addition to my collection. After a while fortune again forsook me, and my assistants became incorrigibly drunken; so, having secured a few pounds of the hard yellow earth, I turned my face homeward. I sailed from Melbourne on the 24th of July, 1854. My last entomological doing was the finding of several cocoons of Pelora Oxleyi at Brunswick, near Melbourne. Several Saturnias which I had in cocoon emerged when we were off

Pernambuco, and one specimen of Entometa in England, in July, 1855.

T. J. R. Oxley.

Bayswater, near London,
October 28, 1857.

Proceedings of Societies.

Zoological Society.

Tuesday, November 10, 1857.—Dr. Gray, V.P., in the chair.

Mr. Gould exhibited and described several new species of birds from various parts of the world. He commenced by calling attention to three species of Australian birds, collected by Mr. Elsey during the recent expedition under A. C. Gregory, Esq., from the Victoria River, on the north-west coast, to Moreton Bay. Two of these birds were of especial beauty and interest, viz., a Psephotus and a Malurus. The former is allied both to P. pulcherrimus and P. multicolor, but differs from either, among other characters, by the rich yellow mark on the shoulder; and the Malurus is distinguished from all other members of its genus by its larger size, and by the beautiful lilac circlet which adorns its crown. The third bird alluded to is a species of Petroica allied to P. superciliosa, a bird discovered by the late Mr. Gilbert in the neighbourhood of the Beiderkin Lakes, and which, with the present, would admit of separation from the other species of the genus. For these birds Mr. Gould proposed the following names:—

Psephotus chrysopterygius
Malurus coronatus
Petroica cerviniventer

The next species to which he directed attention was a new hawk belonging to the genus Spilornis, and which differs remarkably from S. undulatus, or Bacha, of the Continent of India, and S. holospilus of Manilla. For this bird Mr. Gould proposed the appellation of Spilornis rufipectus. It was obtained in Macassar by Mr. Wallace.

A new bullfinch of typical form was described under the name of Pyrrhula aurantia. For his knowledge of this pretty species Mr. Gould was indebted to the researches of Dr. A. L. Adams, of the 22nd Regiment, who killed it in the Western Himalayas.

For a new motmot Mr. Gould proposed the name of Momotus æquatorialis. This is a large and robust species, and differs from all others in the broad spatulate feathers of the breast tuft. It was obtained at Ardudona, near the equatorial line, in the Andes.

A very fine Odontophorus, remarkable for the rich chestnut-red colouring of its under surface, received the appellation of Odontophorus hyperythrus. For this bird Mr. Gould is indebted to the Messrs. Verreaux, of Paris, who obtained it in a collection from Santa Fé de Bogotà.

Mr. Sclater read a note on an unnamed parrot now living in the Society's Gardens, and on some other species of the same family. M. Auguste Sallé having called his attention to the fact that the whitefronted parrot of San Domingo, commonly regarded as the immature state of Chrysotis leucocephala, is in truth quite a different

species from that bird. It may be distinguished at once by having no red on the throat, and a narrower white frontal band than the true leucocephala, which is from Cuba. M. Sallé, who has had ample opportunities of observing this bird in its natural state, is quite confident as to its distinctness. Mr. Sclater proposed to call the San Domingo bird, which has not yet received a specific designation, Chrysotis Sallæi, as a just tribute to one who has made such extensive discoveries in the Natural History of the New World.

Mr. Sclater also read a paper on a collection of birds received by M. Sallé from Southern Mexico, in which he described a new species of Diplopterus, under the name of D. excellens. The author's attention was called to this bird by M. Jules Verreaux, whose experienced eye is ever active in distinguishing new species.

At the conclusion of his paper Mr. Sclater observed that M. Sallé had, at his request, drawn up a list of birds met with by him in San Domingo, together with some interesting observations on their habits. He had taken some pains in the verification of the nomenclature of M. Sallé's list, and added a few observations on the range of the species

The Secretary read a paper by Sir John Richardson, M.D., F.R.S., on a new species of Siphonognathus, which he characterized under the name of S. argyrophanes.

The Secretary exhibited to the Meeting drawings of the Honduras turkeys, and a pair of very young Pumas now living in the menagerie.

Tuesday, November 24.—John Gould, Esq., V.P., in the chair.

The Chairman called the attention of the Meeting to four new species of rodents from Australia, which he described under the names of Mus assimilis, M. nanus, M. sordidus and M. manicatus. To these interesting species of the mammals of that country a fifth was contributed by Dr. Gray, from the collection made during the expedition under A. C. Gregory, Esq., which he has named Hapalotis hemileucurus.

The Chairman exhibited an unique Australian bat (*Molossus australis*) from the museum of the United Service Institution, to which it had been presented, in 1832, by Major M'Arthur.

The Secretary read a paper by Dr. Gray on the genus Furcella of Oken. On making an aperture in a perfect specimen of Furcella which recently reached his hands, Dr. Gray found that although the animal had two of the characteristics of the family Teredinidæ it wanted the third (the plates within were only the pallets, which are simple and somewhat like those of the more common Teredo norvegica); that there were no proper shelly valves, nor even any rudiments of them; and that the animal forms a genus in that family which has the abnormal character of wanting the true shelly valves which are so universal in the Conchifera. The reason of this absence seems to be explained by the fact that the animal does not require them to protect its head and nervous centre, living as it does in a soft sandy mud; while they are required in Teredo and the allied genera, which have to bore their way into hard wood or stone to form the hole that is to be lined with the shelly tube. Sir Edward Home, in his 'Lectures,' when describing the animal of Teredo navalis, refers this shelly tube to the genus Teredo, and gives a very good figure of the pallets, or, as he called them, "operculum;" but he was not aware of the absence of the shelly valve, for he figures what he considers the "boring shell of the same Teredo:" what he has

here taken for the "boring shell," or true valves of the animal, is evidently a fragment of the plate which closes the end of the tube.

Mr. Sclater communicated a review of the South American family Momotidæ, containing descriptions of all the known species of these birds, with an account of their synonymy and geographical distribution. In this paper the previously undescribed species were characterized as M. microstephanus and M. Nattereri, the former from New Grenada, the latter from Bolivia; and it was proposed to employ the term Prionirhynchus instead of Crypticus (previously used for a genus of Coleoptera), and to elevate the peculiar Prionites superciliaris to generic rank under the title of Eumomota.

Mr. Sclater also read an account of a small but interesting collection of birds lately transmitted by Mr. H. W. Bates from the Upper Amazon. Amongst the more noticeable species herein contained were a new Capito, proposed to be called C. aurantiicollis; and a specimen of Chiroxiphia regina, a new manakin, allied to C. pareola, which was until then only known from Natterer's specimen in the Imperial Cabinet at Vienna.

With reference to Mr. Gould's Australian mammals, Mr. Sclater remarked that the fact of Chiroptera and Rodentia being the only orders besides marsupials met with in Australia was an additional argument in favour of the low position in the series of Mammalia lately assigned to the two classes by Professor Owen.

Mr. F. Moore read a paper on the Asiatic species of Neptis and Athyma, in which he described eight new species of the former and eleven of the latter.

The Secretary read a letter addressed to Mr. Gould, from Mr. Cumberbatch, respecting the weight of the common partridge in those districts of the New Forest in which they appear to feed exclusively on bog plants, and have no access to corn-land. Three of these birds weighed respectively 13 oz., 12¼ oz. and 11¼ oz.—*D. W. M.*

Northern Entomological Society.

September 11, 1857.—B. Cooke, President, in the chair.

Election of Members.

B. B. Labry, Esq., of Manchester; John H. M'Keand, Esq., and Robert H. M'Keand, Esq., of Lawton; and G. A. Almond, of Birkenhead, were elected Members of the Society. Edwin Shepherd, Esq., of London, was elected an Honorary Member.

Exhibitions.

Mr. Allis, of York, exhibited a large box of varieties of Lepidoptera; amongst them were extraordinary varieties of the following species:—Vanessa polychloros and V. Urticæ, Argynnis Adippe and A. Aglaia, an hermaphrodite A. Paphia, an Apatura Iris without the usual white markings, an Arctia caja with red markings upon the superior wings, Phragmatobia Menthrasti (*var.* Walkeri), P. lubricepeda (*var.* radiata, *Haw.*), and a singularly light variety of Ceratopacha ridens.

Mr. Allis also exhibited a box in which were Hydræcia palustris, Valeria oleagina, Agrotis fennica, &c.; also a box in which were a series of the autumn brood of Harpalyce silacearia, eight Nonagria concolor, eight Sciaphila bellana, twelve Laverna

phragmatellus, *Bent.* (which he distributed amongst the members), a fine specimen of Acidalia rubricaria captured near York, Gelechia inornatella, Melosoma bipunctellus, Lithocolletis irradiella, Œcophora formosella, Coleophora chalcogrammella, and C. Frieshella.

Mr. Buxton exhibited a box of Lepidoptera, the most interesting species in which was a fine specimen of Heliothis armigera; he also distributed a number of Harpalyce picaria amongst the members.

Mr. Hague exhibited six hybrids between Smerinthus Populi and S. ocellatus, which he had bred from eggs obtained by Mr. A. Lomax, who has devoted much time to breeding hybrids.

Mr. Carter exhibited a box of exotic Coleoptera, from his collection, containing twenty-eight species of Longicorns, unnamed; they had recently been returned from Mons. Chevrolat, of Paris, as new species. Two of them were from Australia, one from Texas, three from Venezuela, two from Silhet, two from Brazil, five from North America, one from the East Indies, and of the remainder country unknown.

Mr. Linton exhibited a box of Hymenoptera containing many interesting species.

Mr. Greening exhibited a large box containing specimens in several orders, principally Hymenoptera, Diptera and Hemiptera. The most noticeable species in this box were,—in Hymenoptera, Cimbex femorata and Hylotoma ustulata; in Diptera, Chironomus rufipes, Erioptera maculata and nodulosa, Limnobia lineola, nigrina, punctata, vagans, tripunctata, nubeculosa, dumetorum, glabrata, immaculata, and a pretty species allied to trimaculata, Tipula lutescens, gigantea, longicornis, lateralis, vernalis, lunata, &c., and a number of interesting Trichoptera. The contents of this box were much admired for the beauty of the specimens and the setting of the Tipulas, and an interesting discussion ensued on the best way of capturing and setting them.

Several members remarked on the unusual abundance of Locusta migratoria (one of which, taken at Warrington, was in Mr. Greening's box), observing that it had appeared throughout Great Britain and Ireland this season.

The President exhibited the following insects, captured by himself this season:—Myrmedonia canaliculata, Antherophagus pallens, Ips quadripunctata, Macrocera vittata, phalerata, fasciata, Chironomus virescens, Tipula lutescens, longicornis, scurra, Asilus albiceps, Thereva bipunctata, Platypeza infumata, Sciomyza corregiolata, Osmylus chrysops, &c.

The Secretary exhibited two specimens of Acontia luctuosa on behalf of Mr. Battersby, who had met with this species freely near Torquay; also a box kindly furnished by Mr. Brown, of Cambridge, containing Tortrix dumetana, Pionea margaritalis, and Polyommatus Arion, recently captured by himself; and a box containing Mixodia Turionana, Laverna phragmatellus, and Nonagria concolor, which had been presented to him by Mr. Doubleday.

Mr. Gregson exhibited the larvæ of twelve species of the genus Eupithecia upon their food-plants, observing that nothing was easier to find in the larva state than this hitherto much-neglected genus, and that now was the time to go beating for the tree, hedge and shrub feeders, sweeping for the heath feeders, and hunting for those which feed upon low plants, or upon plants which grow where beating and sweeping are impracticable, and for the seed feeders, some of which could not well be beaten out or swept for advantageously. The principal species exhibited were Eupithecia satyrata, upon flowers of Scabiosa succisa, discovered by Messrs. Logan and Wilson, and

sent by Mr. Wilson; E. linaria, upon flowers and seed of the common toadflax; E. minutaria, flowers of Calluna vulgaris; E. sobrinata, junipers; E. castigaria, seed of Lychnis diurna; E. castigaria from Mr. Wilson; E. centureata, upon flowers and seed of Senecio Jacobæa; E. irriguata, sloe-leaves; E. succentureata, found upon wild plum where Linum was growing in the same bush, but never observed to eat either, also found freely upon Achillæa Millefolium (principally sent by Mr. Wilson); E. Absinthiata, taken freely on flowers and seed of Senecio Jacobæa; E. assimilata, under black currant leaves.

Mr. Gregson also exhibited a box containing seven varieties of Abraxas ulmaria, collected over a series of years, observing that Mr. Dale had kindly sent down a continental specimen of Abraxas pantaria, *Linn.*, for comparison, and he had little doubt of its being only a variety of ulmaria, for two of his recent light varieties were counterparts of what the foreign one had been when it was first captured (age had taken from its beauty); the under side also agreed exactly.

He also exhibited a box of Coleoptera recently captured; amongst them were Anchomenus marginatus and sexpunctatus, Bembidium bipunctatum and pallidipenne, &c.

Acentropus niveus a Lepidopterous Insect.

The following paper, contributed by Edwin Brown, Esq., of Burton-on-Trent, was read by Mr. B. B. Labry, the author being unavoidably absent:—

"I am glad, as a sort of inaugural thesis, to communicate to the Society the fact of my having *proved* Acentropus niveus to be a lepidopterous insect. I had spent many hours at various times in search, by means of my boat, after the earlier states of this insect, and had carried home many curious larvæ captured amongst the waterweeds, in the hope that some one or other would prove to be the right one, but without effect, until I one day found, in the axils of the thread-like leaves of Potamogeton pectinatus, several small silken cocoons, strengthened by the incorporation of small pieces of leaves, arranged lengthwise, from the same plant. On reaching home I placed them in a deep dish of water, in which were some stones projecting above the water, and, having placed the dish in my garden, so as to secure the full light of the sun upon it, I covered the whole with a bell-glass. On the following day I had the great gratification of observing a perfect male Acentropus niveus resting upon one of the stones: I searched for and found the empty chrysalis, and in the evening sent it off to Mr. Haliday, in proof of the lepidopterous nature of the insect. Depending upon obtaining a further supply of larvæ on my next visit to the river, I opened the remaining cocoons, and found therein one similar pupa undeveloped, and two or three small greenish larvæ, which I presume to be those of Acentropus niveus. Unfortunately the heavy rains of last month set in immediately afterwards, and the floods prevented me going on the river again until all trace of the early stages of the insect was lost. The pupa-case puts the relationship of the Acentropus beyond a doubt: it is clearly the chrysalis of a moth, and I presume the proper location of the species in our list will be immediately after the genus Hydrocampa."

Mr. Brown added that he had before him three examples of Locusta migratoria recently captured in his neighbourhood, and that another example was seen but not caught. One female had deposited some eggs.

An interesting conversation ensued, all the members evincing great pleasure that this long-disputed question was brought to a close, especially as it had terminated

in accordance with the opinions of the northern entomologists, and had been determined by one of them.

The Secretary observed that Westwood had certainly placed it as a lepidopterous insect many years ago, but in the comparatively recent work, Westwood and Humphrey's 'British Moths,' 1845, he had placed it (provisionally it is true) as the very last moth before the plumes, observing that "it should probably be placed nearer to some of the Hyponomeutidæ," and giving the presence of a pair of tippets, and a spur at the base of the fore margin of the hind wings, as two characters it possessed which are distinctive of the Lepidoptera. His generic and specific descriptions of this moth, however, are such as to lead to the conclusion that Mr. Westwood had not an opportunity of thorougly examining the Acentropus, the insect being nearly related to the Pyralidæ, and having no relationship with the Hyponomeutidæ whatever.

The special thanks of the Meeting was voted to Mr. Brown for his interesting and instructive paper, and, the thanks of the Meeting being voted to the exhibitors for their kindness, the members and friends separated, after having had a regular "red letter" Meeting.—*C. S. G.*

Anecdote of a Dog.—Yesterday a dog was brought up from Edinburgh in a steamer to St. Katharine's Docks. It was brought to a gentleman's office by a man, and remained there all day. The gentleman walked home with it to Barnsbury, leading it by a chain, and it was chained up in the coach-house. During the night it slipped its collar and got away. When the gentleman went to his office this morning he found that the dog had been brought there again: it had found its way back to the very ship in which it had been brought to London, having walked all the way from Barnsbury to St. Katharine's Docks.—*Robert B. Were; London, November* 17, 1857.

Occurrence of the Great Spotted Woodpecker (Picus major) *at Dulwich.*—On the 6th of the present month a female specimen of this bird was found dead on a hedge-bank in this neighbourhood. To all appearance it had been killed either by a stoat or weasel. I have observed it in this locality before, but it is evidently scarce with us here. The smaller species, Picus minor, is more common.—*C. Wood; Dulwich, November* 13, 1857.

Nesting of Swallows and other Birds.—In a late number of the 'Zoologist' (p. 5790) reference is made to the fact of swallows attaching their nests to the side of a wall without being supported by a projecting ledge, as is usually the case. A year or two ago a pair of swallows built their nest in a coal-cellar here in the manner described. The nest was quite open at the top, as swallows' nests usually are, and was attached on one side, to the wall only; it was placed at the distance of a few inches only from the roof. The brood was reared in safety. It would certainly seem wonderful how the nest could bear them; but young birds, especially swallows and martins, cannot be very heavy; and the clay, which they both use alike in the construction of their nests, is very tenacious. The writer has also some remarks on the wren being a late breeder. I have found its eggs in the last week in July, which is, I

think, even later than he mentions; eggs of the greenfinch are, however, often to be found in August, and both this year and last I saw young greenfinches which had not left the nest by the end of the first week in September. The barn owl must also, in some cases, be a very late breeder, as this autumn I saw a young bird, taken from the nest early in September, which was still covered with down, and could not fly in the middle of that month.—*E. J. Tuck; Wallington, Herts, October* 22, 1857.

Notes on the Swallow.—The last swallows which I have had the pleasure of seeing here appeared on the 4th of this month, and were watched most wistfully until they were out of sight. They have delighted, I dare say, as much as we have in the glorious summer which has lately left us. Their increase has been unusually great: two pairs (chimney swallows) came to my outbuildings in the spring, but they had increased to sixteen before they left. I never see a new house rise hereabout which has not its own swallows during the first or second summer. The rising ground on which this house stands, about a mile from the Thames, is one of their favourite trysting-places in the autumn, and here they gather from the neighbouring country round before they go to roost. The muster this autumn was one of the most interesting ornithological conclaves it has ever been my good fortune to witness. On one evening especially they came in countless numbers, and I think even surpassed the multitudes which assemble at some of the breeding-places of the sea birds on the coast. The sky was brilliantly blue, and as far as the eye could see they covered the firmament as the stars cover the heavens on a winter night, and as far as the telescope could reach its disk was covered with them. Their cheerful chattering was most delightful to listen to: it was one unceasing hymn of praise. They had come in groups, and chiefly from one direction; but their departure was in a moment: I had turned round to speak to Mr. Hancock and his sisters, who were delighted spectators of the wonderful scene, and, to the astonishment of us all, they were gone; in a minute there was not a single swallow left. The concourse was chiefly of chimney swallows; there were few house martins, and a good many sand martins. House martins are scarce here, and I sadly miss them. There is no better climate in England, and the only way in which I can account for their absence is by supposing that they have difficulty on our gravelly soil in procuring clay with which to build their nests. I am told that the swallows sleep on the willow-beds on the river, and one evening, whilst I was in the low ground between this and the Thames, a cloud of them passed over very near my head in rapid flight.—*W. C. Hewitson; Oatlands, November* 15, 1857.

Occurrence of the Avocet (Recurvirostra avocetta) *in Kent.*—I have just preserved a fine specimen of this bird for Mr. Gateridge, of Faversham, Kent, shot close to the town. A few years since it was to be found in numbers in this neighbourhood.—*James Gardner; 52, High Holborn.*

Concerning a venomous Lizard in Gujerat.—Can any of the readers of the 'Zoologist' who are learned in the Reptilia give me information concerning a venomous lizard said to inhabit the district of Gujerat, in Hindostan? Is there indeed upon record any well-authenticated instance of the existence of any such reptile anywhere? Yet such I am assured is the case in the instance to which I refer, and I have it vouched for upon such unquestionable authority as appearsto me to leave no room for doubt upon the subject. My informant, an Indian officer of many years' experience

and of unimpeachable veracity, says there exists a lizard known to the natives by the name of the "Chând 'n ghûr" (the spelling is my own), the bite of which is of so deadly a nature that death invariably follows in the space of two or three hours. My informant states that three instances came under his own observation in which death ensued from the bite of one of these reptiles; and at length he had an opportunity of bringing to the test of anatomical dissection whatever doubt he might still have entertained upon the matter. Within his own "compound," and near to an old ruined wall, he saw a "Chând 'n ghûr," which he transfixed with his spear, and said to the doctor of the regiment, who was present and had repeatedly denied the existence of venomous lizards, "Now, doctor, I'll make you a bet that this lizard has poison-fangs." "Done," replied the doctor; "I'll lay you a gold mohur he has none." The doctor accordingly took home the defunct lizard, and upon dissecting the head found the entire apparatus of fangs and poison-glands fully developed, in the same manner as in the viperine tribe. The lizard is described as being from 18 inches to 2 feet in length, very agile, of a brown colour with ochreous-yellow spots, and is said to delight especially in old ruinous walls, in the neighbourhood of which it is always found.—*W. V. Guise; Walsingham Abbey, November* 3, 1857.

Spider Silk.—Seeing a notice (Zool. 5835) concerning the silk obtained from a species of spider, a native of Austria, I beg to say that in the Bermudas, some three years ago, I obtained silk from the large spider of those islands, Epeira clavipes, which was so strong that I could wind the single thread, from the insect itself, on a piece of paper, just as I would wind cotton upon a reel. This is the species of spider that forms its web between cedar trees, often ten feet apart; and in this formidable net, composed of the silk I have mentioned, are captured a large and powerful species of Cicada (*Fidicina Tibicen*), and sometimes even the little bird locally named "chick of the village" (*Vireo noveboracensis*). I may also add that the Mudian ladies use this silk for sewing purposes. I had this latter fact from an old lady who had been resident in the Bermudas all her life.—*J. M. Jones; November* 12, 1857.

Lepidoptera at Plymouth.—Colias Edusa: about a hundred specimens have been taken here during the season. C. Hyale: three specimens. Sphinx Convolvuli: I have had two specimens brought to me. Acherontia Atropos: one larva was brought to me, but a brother collector obtained upwards of fifty. Heliophobus hispidus: I have been exceedingly fortunate with this species, having had a large catch.—*J. J. Reading; Plymouth, November* 21, 1857.

Colias Edusa in Scotland.—As there is only one recorded capture of this insect in Scotland (Zool. 1985), it may be interesting to know that this season eighteen specimens have been taken in the neighbourhood of Dumfries. Being at Southerness, a small sea-bathing place on the Kircudbrightshire coast, I took two males, one on the 24th and the other on the 31st of August; but on the 12th of September I was so extremely fortunate as to capture a couple of females (one of them so exceedingly fine that it must, I think, have emerged from its chrysalis the same day), which are, I believe, the first ever taken in Scotland. The same day I caught two more males, and

another collector also obtained a pair. About ten individuals were also captured near Dumfries at different times, making, with the eight mentioned above, a total of eighteen, sixteen of which were males, the only females being the two obtained by myself: such a disparity in the numbers of the sexes is very remarkable. I may add that on the 14th of September I saw what appeared to be C. Hyale, though it may only have been Helice, but I am pretty confident it was Hyale. I had a good view of the insect, as it led me a long and exciting chase, which I was at length forced to give up from want of breath. I am aware that entomologists do not attach much value to the mere "seeing" of insects; however, I only wish what I have written to be taken for what it is worth.—*Wm. Stewart Thornburn; Southerness, by Dumfries.*

Curious Variety of Apatura Iris.—On the 13th of July I had the good fortune to capture, in Ashton Wold, near this place, a very singular and interesting variety of Apatura Iris, a notice of which may perhaps prove interesting to some of your readers. In this example there is an entire absence of the beautiful white band which, in the ordinary specimens, crossing the middle of the hind wing, extends into the middle of the fore wing. Of the five white spots extending in a curve from the costa to the anal angle one spot only, *viz.* the fourth, is visible; the two spots near the tip are smaller than usual, the second of the two being little more than a speck; the costa and tip strongly powdered with fulvous; and the usual fulvous ring of the posterior wing, being broken on the lower side, extends in a strong fulvous marking over the anal angle. The rich purple shade is spread over the wings as in the ordinary insect, blended, however, in parts with fulvous. The under side is equally remarkable, though difficult to describe, the colouring and markings being much confused. Different as this is from the ordinary specimens, yet to an experienced eye it is obviously no other than a variety of Apatura Iris.—*William Bree; Polebrook, Oundle, Northamptonshire, December* 5, 1857.

Remark on Melitæa Dia.—I see by the 'Intelligencer' (iii. 60) that there is a record of the capture of a third specimen of Melitæa Dia. The other two specimens I had the good fortune to capture, in Warwickshire, years ago.—*Richard Weaver;* 25, *Pershore Street, Birmingham, November* 13, 1857.

Remarkable Variety of Argynnis Euphrosyne.—Mr. Weaver has placed in my hands a specimen of Argynnis Euphrosyne so remarkable that I think the readers of the 'Zoologist' will take some interest in a description of it. The specimen is rather above the average size, and the spathulate terminal portion of the antennæ is of nearly double the usual length; the apex itself is very much flattened and twisted backwards. The upper surface is nearly black, the usual tawny spaces being almost obliterated by the suffusion and union of the black markings; this is more particularly the case with the hind wings, in which the only remaining traces of tawny are confined to the anal angle, and six obscure spots just within the outer margin. On the under side the colours of the fore wings are more suffused than usual, but otherwise not remarkable, but the distribution of colour in the hind wings is totally changed; the prevailing colour towards the base is greenish yellow; the marginal silver spots are changed into large silver markings of an elongate-conical form, and the middle one of the seven unites with the large silver spot in the centre of the wing.—*Edward Newman.*

Is not Satyrus Typhon a Species?—I observe in Mr. Stainton's useful 'Manual of British Butterflies and Moths' there is no mention made of Satyrus Typhon, but only of S. Davus. In my opinion there are two species included under this name, and I

send you for examination a pair of what I believe to be the second species: it is smaller, and without the spot on either side. I am well aware that S. Davus is very variable, but there must be some limit to variation. It is said that the larva of Davus is unknown, but I have often had the larva and bred the butterfly, and so have many others; and I have always taken what I call Davus on low moors or mosses, like Chat Moss; but what I take on the high mountains of Scotland appears to me to be distinct, and few men have had the opportunity of examining it in its native habitat as I have done.—*Richard Weaver; November* 13, 1857. [The mountain specimens sent me by Mr. Weaver are exactly as he describes them, without spots; but I do not wish to express any fresh opinion as to its specific difference.—*E. N.*]

Plentiful Occurrence of Trochilium vespiforme in England.—In the summer of 1855 a farm servant caught, amongst a host of other insects, two of the above-named, but in very sad condition. The following summer none were obtained, but in 1857 enough were caught to make a goodly series in my own private cabinet. I have every reason to believe that this is another Trochilium taken only in this country, and hardly known to the continental collectors. For several reasons I must decline giving the locality for some time to come.—*James Gardner; 52, High Holborn.*

Habits and Locality of Anthrocera Minos.—Although not yet able to trace this insect through all its stages, owing to want of suceess in rearing the larva, it may be interesting to many entomologists to know that in the pupa state its habits are very different from those of our other species of Anthrocera. The cocoon is not pointed at the ends, but oval, of an earthy colour, and, in the instances in which I succeeded in finding it, attached to a stone at the surface of the ground. From the profusion in which the perfect insect exists in a very restricted locality, and the fact that only two cocoons rewarded a very careful search, I am inclined to think it is ordinarily placed among the roots of the grass, but the locality is one in which the most adventurous pupa digger would hesitate to commence operations with his trowel. The fields in which alone Minos is found in abundance are of what has been well called the pavement order, platforms of solid rock with narrow avenues of verdure between: this is the character of extensive districts in the county of Galway, apparently caused by the long-continued action of currents of water, which has removed all earthy substances, and left exposed the rocky skeleton of the globe for the edification of geologists and the excoriation of the shins of the hasty insect hunter. Little value as one would suppose these stony tracts could be to any one but the naturalist, they are elaborately divided into sections by huge walls of rounded limestone boulders, so ingeniously piled up, without mortar, as frequently to bring down on the unwary trespasser who essays to cross them a dangerous avelanche of stone. Filipendulæ is the only other species of Anthrocera I have observed in the West of Ireland; it flies in company with Minos, in the proportion of about one to ten, and is readily distinguished on the wing by its larger size and brighter colouring. Minos is apparently very little subject to variation: out of one thousand specimens taken this season only two presented any noticeable difference from the ordinary type; in these the whole surface of the wings is suffused with crimson. They fly actively in the sunshine during the early part of the day, but after 4 P.M. are to be captured with the greatest ease asleep on the flowers; in some favoured spots every daisy will have its tenant, and I have seen as many as eight clustered on a dandelion, giving it at a little distance the appearance of a gorgeous crimson flower, enchanting alike to the naturalist and the painter.—*Edwin Birchall; Dublin, November* 28, 1857.

Lasiocampa Callunæ : is it a Species ? — Mr. Richard Weaver, as much as nine years ago, contended (Zool. 1655) that it was; and since that time many other entomologists have expressed the same opinion. Nevertheless, the name has never appeared in our lists. I will now present the readers of the 'Zoologist' with my own observations on the subject. Early in the present year, that is in March, 1857, chance took me to Scotland, and, thus being on the right ground, I resolved to learn all I could, and form my judgment from my own personal observations; and, by the way, if all entomologists did the same we should not have so many mistakes made and repeated as we have at present. In the April following, while collecting on the moors, I found several empty cocoons and two full ones. These were spun up amidst moss and heather, and in the very wettest places. This is quite at variance with the usual habits of its congener, L. Quercus; and I was, moreover, particularly struck with the greater size and peculiar colour of the cocoons. Towards the end of June I observed several males flying over the moors, but I did not capture one. However, early in July a boy brought me a female, which soon deposited a number of eggs, much larger than those of L. Quercus. The young larvæ soon made their appearance; and I instantly had the pleasure of observing that they were totally different from those of Quercus: they were of a dark brown colour, with bright yellow bands between the segments of the body, very much as in the young larvæ of L. Rubi, which, indeed, they much resembled; and they had none of those white hairs which distinguish the young larvæ of L. Quercus. Some of these larvæ were sent to Captain Cox to figure, and others retained: these, as they advanced towards maturity, became more and more like their congener, especially in the last skin, a fact already stated by Mr. Weaver. The larvæ I retained have spun up, and I have several now in pupa. The full-grown larva is larger than that of L. Quercus; it feeds greedily on heather (*Calluna vulgaris*), ivy, birch, raspberry, sallow, and every other plant that comes in its way. The imago is much larger, and different in colour. I feel certain therefore that L. Callunæ is a species. Suppose I were to state that Psi and tridens, or Cucullia Verbasci and Scrophulariæ, were one species, and point to the exact similarity of colouring and marking, would not entomologists at once reply, "Oh, but the larvæ are totally different." This is considered conclusive and unanswerable, and if so in one case why not in another? I may add that L. Callunæ was found in the fens of Huntingdonshire many years back, by Mr. Courtnay, Mr. Standish and myself, as recorded at the time (Zool. 1731). In conclusion, I have only to add that I shall have great pleasure in answering any questions or objections that may be raised by any one in the pages of the 'Zoologist.' — *H. J. Harding;* 1, *York Street, Church Street, Shoreditch, November* 30, 1857. [The capture of Lasiocampa Callunæ in Huntingdonshire has been regarded as militating against the specific distinctness of what is called the Scotch eggar; but this observation will be found to bear only on the impropriety of that name. Supposing the two species to be really and permanently distinct, I should expect to find them domiciled together at Kinloch Rannoch, the fens of Huntingdonshire, Hampstead Heath, Dartmoor and the Cornish Heaths. If we find a large and dark-coloured insect confined to Scotland, the very excusable and immediate conclusion would be, "It is only a Scotch variety;" but a more philosophic inquiry is opened up by the southward extension of its geographical range. — *E. N.*]

Does any Insect feed on the Tea-tree ? — Mr. Stainton having, in his 'Entomological Botany,' led us to suppose that every tree and plant is preyed upon by some

insect, can any one inform me how it happens that we never meet with any dead insect or foreign substance in that article of universal use, tea. As tea cannot be sifted like most commercial products, it has always appeared to me a very remarkable circumstance that it is so totally free from anything unpleasant. Query, is there something so poisonous in the juices of the tea plant that insects will not meddle with it?—*William Atkinson.*

Notodonta Carmelita in 1858.—We hear of no fewer than 150 chrysalides of this insect having been imported from the Continent, to make their appearance here in May next as genuine British examples. We wonder whether it will occur in the woods in the neighbourhood of Sheffield?—*John Scott; Southfield Villas, Middlesbro'-on-Tees, November* 14, 1857.

Habits and Locality of Miana expolita.—This insect occurs in abundance in the West of Ireland at the end of June; its time of flight is about 4 P.M., but, from its small size and the rapidity of its movements, it is extremely difficult to capture. The males have the same habit of assembling round the female as the Bombyces, and by watching their flight we were able to take up a position near the centre of attraction, and secure them with comparative ease as they approached the spot. I should like to know whether any of the night-flying Noctuæ have been observed to assemble. The Irish specimens of Miana expolita are much brighter and richer in colouring than any I have seen from Darlington. When in perfect condition it is a beautiful insect, very different from the dingy little thing which represents it in most cabinets.—*Edwin Birchall; Dublin, November* 28, 1857.

Why is empyrea considered a Phlogophora?—I think some mistake has occurred in placing this insect amongst the group of which the meticulosa of our cabinets forms the type. In no character whatever does empyrea bear a resemblance to meticulosa, or even a species of which we are taught to consider Phlogophora as the generic title. The striking feature in this genus is the peculiarly scalloped wing, and empyrea does not show this. Besides, the colours of the genus Phlogophora are entirely composed of fawns and greens, and although this is of no importance in determining the place of the insect in question, yet one cannot help calling to remembrance what impresses the eyes and mind most forcibly when we are led to speak of the genus, or on looking over foreign species. Now, if empyrea be placed alongside lucipara, even a casual glance will convince any one that the general contour of the two insects are very similar, that the dark band of the wings is exceedingly like to each other, and that the position of the pale stigmata is the same in both; and I would propose that it be at once removed from the genus Phlogophora to that of Euplexia, as being most in harmony with requirements of that genus.—*John Scott; Southfield Villas, Middlesbro'-on-Tees, November* 17, 1857.

Capture of Ennomos fuscantaria near London.—A few days since, on looking over my captures of the past season, my attention was attracted to what I then thought was a specimen of Ennomos tiliaria. Upon closer examination and comparison with E. fuscantaria, I observed a similarity; I could not, however, be certain, and therefore took it to Mr. Newman, to whose kindness I am indebted for a comparison with a specimen he has, and with those at the British Museum. I am happy to say it proved to be E. fuscantaria. By reference I find I captured it near Kensington, on the 27th of August last, on a gas-lamp. I believe it is the first specimen that has been taken in that neighbourhood.—*John Henry Tilly; 3, Bernard Street, Regent's Park North, London, November* 2, 1857.

Tischeria angusticolella, Heyd., *and Solenobia triquetrella*, Hubn.—I bred the above additional species to our list in May last. The former makes a blotch mine in rose leaves, the perfect insect resembling Gelechia tenebrosella; the latter from cases found on and *under* mill-stone, grit-stone, &c., on the moors. This species and its habits are fully described in Bruand's 'Psychides,' pp. 106—7.—*R. S. Edleston; Bowdon, December* 7, 1857.

Note on the regular Perforation of Leaves.—May I venture to ask, through the medium of the 'Zoologist,' if a satisfactory explanation can be given of the symmetrical perforations found in the inclosed elm leaves? Are they the work of an insect, or the natural though unusual form of decay of the leaf? The leaves thus perforated were all found on the ground: can they be found in the same state when growing on the tree?—*Marie Wiry; Lentonfield, near Nottingham, November* 10, 1857. [The leaves are those of the wych elm, and the holes occur, with wonderful symmetry, at equal distances on each side of the midrib. They are evidently the work of the larvæ of a sawfly, which lays its eggs on the midrib of the leaf, and the young larvæ, descending right and left, devour the leaf, each making a single hole. It is, however, very difficult to account for the close similarity of size and shape observable in each opposite pair of holes. Something very similar has been observed in the destructive labours of the gooseberry grub, and a leaf thus perforated is very accurately figured at p. 59 of the 'Letters of Rusticus.'—*E. N.*]

Fungus on a Rhyncophorous Beetle.—Mr. Ingall has placed in my hands a specimen of Heilipus brachypterus which is in the finest condition, and looks as though it had been pinned while living, yet has several specimens of a black thread-like fungus, probably a Sphæria, growing from various parts of its body; three of these, about an inch in length, issue from the interstice between the prothorax and elytra; a fourth issues beneath the head, from the interstice between the head and prothorax; and there are many shorter ones in a diversity of situations; but none appear to have pierced the more solid parts of the exo-skeleton.—*Edward Newman.*

Notes concerning the capture of several interesting Species of Coleoptera.—Carabus intricatus is no longer a great rarity in this country. I have given a deal of time during the last three years to the working up of this insect, but until the autumn of 1856 had not met with living examples, having found remains only. Last autumn I accidentally found a wounded but still living specimen, which gave a clew to a habited locality. Having called upon a brother collector, and made known to him my fortune, I proposed that we should go and try for other specimens; accordingly, we started, and on the first day obtained several examples. I worked the whole of last winter and the preceding and present autumns, and find that up to the present time I have captured no less than 115 living specimens. The modes of capture are various, viz., by sugaring, searching among moss and loose stems of ivy upon trunks of trees, and by baiting wide-mouthed bottles with dead slugs. The times of appearance are early in summer and autumn, but the best time is the latter, as they are then fresh from the pupa condition and still immature; great care is necessary at this period in handling them, or they harden deformed: October is the middle of the season. They vary very considerably in size, as well as in intensity and shade of colouring, the size varying from 10 to 15 lines in length and from $3\frac{1}{2}$ to $5\frac{1}{2}$ in breadth, and the colour of some being almost black, others possessing fine tintings of green and violet. The period of impregnation is the spring; at no other time have I observed them in coition. The larva of this species I have not yet met with. C. intricatus, in common with other species of the genus, is supplied abundantly with a powerful acid of a caustic nature,

as a means of defence against mightier animals; it is a fine adaptation, and one of the wonders of animal chemistry: this fluid is ejected from the anus. I have paid the penalty upon three occasions by having the acid thrown into my eyes, which for a long time were very painful. I will venture to say that no animal which preys upon this insect could maintain its hold should the discharge take place in either its mouth or eyes. I have, just by way of experiment, taken a male intricatus between my fingers and squeezed it slightly: it instantly discharged enough to make a patch upon my hand the size of a sixpence; a portion of this I placed in contact with my tongue; the effect was that of a strong acid, and the pain of course great: my tongue now presents a white patch, and I believe the skin is destroyed. I have taken two specimens of this beetle with a large puncture through the elytra, as though caused by the beak of a bird: I think it just possible that a bird and intricatus had exchanged shots. Of Panagæus quadripustulatus I captured eight specimens, on the coast, in April and May of the present year. Stenolophus elegans: Dr. Power, with his usual kindness, took me to the habitat of this hitherto rare species. My baggings were in a great minority compared with the Doctor's; still I captured a good set. Aëpys marinus and A. Robinii are both in plenty upon the sea-shore about Plymouth, the latter species in greater abundance than the former. Of the very distinct species, Hydroporus marginatus, *Dufts.*, I captured six specimens in the spring of the present year. Meloë brevicollis, another of the late Dr. Leach's Devonshire insects, has turned up; last season I took several, and this year I have captured seventeen more: it is a very distinct species; there is a good figure of it in the old Linnean Society's 'Transactions.'—*J. J. Reading; Plymouth, November* 21, 1857.

Capture of a Stenus new to the British Fauna.—Whilst on a visit to North Wales at the beginning of October, I had the good fortune to capture five specimens of a very singular Stenus, new to our British list. The species, which was identified by Mr. Janson (and no doubt correctly) with the S. rugosus of Kiesenvetter, is remarkable, *inter alia*, for the excessive roughness of its sculpture, a peculiarity which imparts to its surface a very uneven, and indeed most anomalous, appearance. It is a mountain insect, likewise, on the Continent; and I could only detect it, at Caernarvon, amongst wet earth and shingle at the edges of a small trickling stream which finds its way into the river which flows down from the Snowdon range through the Llanberis Pass. I may add that it was in company with the elegant Dianous cærulescens, and evidently extremely rare.—*T. Vernon Wollaston;* 10, *Hereford Street, Park Lane.*

Description and capture of Platystethus Capito in Scotland.—During a recent visit to Ross-shire I picked up a Platystethus which is new to me, and also, I think, an addition to the British Fauna. Its more prominent characters are as follows:—Platystethus Capito, *Chevrier; Heer, Faun. Helv.* i. 208; *Ferm. et Laboul. Faun. Franc.* i. 608. Black, shining. Antennæ black, nearly as long as the head and thorax, gradually thickening towards the apex; third joint rather shorter than the second; terminal joint large, oval. Mouth rufescent. Head as wide as the thorax in the male, a little narrower in the female; rather thickly covered with large punctures, those behind the eyes often confluent; labrum and front of the head very smooth and glossy; above the base of the antennæ, on each side, a distinct glossy callus; a nearly obsolete channel on the head behind. Thorax as wide as the elytra, much rounded on the sides, and considerably narrowed behind; dorsal channel distinct; the punctures large and distant, with the interstices smooth and shining. Scutellum generally with two large punctures. Elytra quadrate, punctured in the

same manner as the thorax, but less strongly; having a distinct sutural line, and of a pitchy brown or black colour. Abdomen shining black, much dilated towards the apex, especially in the female. Legs pitchy brown; the trochanters and tibiæ more or less rufescent; tarsi testaceous. The male has the hinder edge of the sixth segment beneath slightly excised, and the seventh deeply channelled; the excision and channel smooth and shining. The seventh segment beneath, in the female, a little produced and rounded. Length 1½ line. Fermaire remarks that this species is incorrectly referred to nodifrons in the Stettin 'Catalogue.' Judging from descriptions, it appears to me to differ from that species in being larger, more coarsely punctured, with the abdomen more dilated, and in having the anterior portion of the head smooth and shining. Ten specimens taken beneath *rejectamenta* on the shore of Tain Frith, Ross-shire, September 14, 1857. — *Thomas John Bold; Long Benton, Newcastle-on-Tyne, November* 28, 1857.

Capture of Læmophlæus Clematidis near Gravesend.—In June last, when searching the Clematis Vitalba, a few miles below Gravesend, for Tomicus bispinosus, I captured a single individual of an insect unknown to me; but on my showing it to Mr. Janson, who was collecting with me, that gentleman pronounced it Læmophlæus Clematidis, a species new to our British list. He immediately set to work to obtain more, and after nearly two hours' hard labour succeeded in capturing two living and four or five dead specimens. I find that in his paper in the 'Entomologist's Annual' for 1858, on new British Coleoptera, he has omitted all mention of my name when noticing this insect, and, as I am naturally anxious to be recorded with himself as one of the original captors, I am induced to trouble you with this short note. Every one must deplore the unhappy, and I might almost say scurrilous, spirit in which the introductory remarks to his paper are written. Surely Mr. Stainton ought to have exercised his duty as an editor in expunging them. However gratifying to the self-love of the author, they cannot fail to be offensive to the many, and must tend to the disparagement of our science in the eyes of those who hope to pursue its study as a relief from the many cares and strifes of daily life. — *J. S. Baly; Kentish Town, December* 22, 1858.

Preservation of Colour in Cassidæ. — On looking lately over some foreign beetles in a bottle of spirits, I found many specimens of a fine Cassida, which had retained their splendid metallic markings, although they had probably been in the spirits several years. When I set some of them, in a few days, all that remained of their former brilliancy were dark markings, something like what you sometimes see in portraits where the artist had freely used white paint. When I took out my drawer containing the English specimens of Cassida nobilis, splendidula, &c., their colour resembled that of a seared leaf; and the thought struck me that their metallic beauty might be preserved by being placed, when freshly captured, in a fluid in one of the glass slides, which contain a well (so called), used for microscopic subjects. I think it would be worth a trial, as the coleopterist would be well repaid, if successful, in having his specimens of Cassidæ preserved in their pristine beauty. — *W. H. L. Walcott;* 11, *Vyvyan Terrace, Clifton, December*, 16, 1857.

Myrmecophilous Coleoptera captured in the Neighbourhood of Plymouth.—Thiasophila angulata, *Eric.*, 20 specimens; Dinarda dentata, *Grav.* (new to Britain), 3; Atemeles paradoxus, *Grav.*, 3; A. emarginatus, *Payk.*, 7; Myrmedonia humeralis, *Grav.*, 4; M. funesta, *Grav.*, 6; M. laticollis, *Maerk.*, 10; M. canaliculatus, *Fab.*, common; Oxypoda formiceticola, *Maerk.*, 2; Homolota flavipes, *Eric.*, 5; H. anceps,

Eric., 2; Leptacinus formicetorum, *Maerk.*, 3; Claviger testaceus, *Preyss.*, 4; Monotoma conicicollis, *Aubé*, 10; Amphotis marginata, *Fab.*, 2. Myrmedonia funesta and Amphotis marginata were taken at Darenth Wood, and I am indebted to Dr. Power for the same, for that gentleman took me to one of his favourite nests, where I captured the specimens. Mr. E. W. Janson kindly named my captures.—*J. J. Reading; Plymouth.*

Occurrence of Chrysomela Banksii in December.—As a proof of the mildness of the present season it may be worth while to state that I observed this afternoon several specimens of C. Banksii crawling over the grass, and on the walls of Pendennis Castle, near this place. It is an insect, I believe, which is usually more abundant in the autumn than during the summer months; for at Killarney, in the South West of Ireland, I have been accustomed to capture it commonly in September and October; but to find it thus active within almost a week of Christmas day I cannot but regard as most remarkable. Judging, indeed, from the general appearance of vegetation, they would appear to have been free from frost in the West of Cornwall, for Fuchsias, Hydrangeas and Calceolarias are still in bloom in the gardens; and I remarked the dog-violet, abundance of daisies, and a species of wild Geranium and Senecio in the open fields about Pendennis.—*T. Vernon Wollaston* (on board the 'Miranda,' off Falmouth); *December* 17, 1857.

What there is beneath our Noses.—My wish is to draw the attention of all and sundry young men who have never bethought themselves about the subject to the wonders which the roadsides, quiet lanes, woods, thickets, moors, or amongst whatsoever kind of scenery they may chance to be located, would yield them, if, instead of frittering away and spending their time without a single thought of seeing into Nature, they would only lie in her lap for an odd half-hour at a time, and recount to themselves a few of the many histories which even a couple of yards' square of a grassy bank furnishes. I feel convinced that one single experiment would astonish them at their ignorance. It startled me considerably, some few years ago, when I first heard of caterpillars taking up their quarters in leaves of grass, and that they were to be found everywhere for looking after; places where I had lain a thousand times, either resting after a day's hunting, or thrown myself down upon with a friend to enjoy our *otium cum dig.*, being tenanted by scores of larvæ mining and working out an existence in such narrow houses; yet there they are sure enough, and abundant proofs have been shown establishing this fact. Broad-leaved grasses or narrow ones, even like a hair, may, on a little examination, be detected occupied by a creature worming its way down between the skins, and in some cases so large (as in Elachista cygnipennella) that one almost fancies they stretch the grass considerably to find room for their bodies. There is no mistaking them when once seen, nor do their jaws ever seem to rest. Take a grass so tenanted, mark it at the place where the larva is, leave it for a couple of hours or so, and then go back and see the progress. Had it been working for a wager, or doing it at so much per yard, it could not have got on faster. Commercial crises don't affect them as they do us poor creatures, and out in their natural state they never get put upon half-time, although they are to be found on short (grass) commons as abundantly as anywhere else. The Great Master gives them a piece of work to do and they do it, whether it be to work out the natural transformations of the creature itself, or as a body on which battens the parasite in its earlier stages. Some of them show a decided partiality for a single kind of grass, while others go in wholesale, and the larva of the same species is to be found in several kinds. E. albifrontella has

about as wide a range as any I know, and zonariella seems as fondly attached to the rough hair-grass (*Aira cæspitosa*). Adscitella, too, has a peculiar liking for the blue moor-grass (*Sesleria cærulea*), for, although plenty of other grasses grow amongst and beside this one, where I find the creature by scores, yet I never found it in any other. Each has also its own peculiar manner of working: some merely cut out a channel large enough to allow the body to pass down, and others mine the whole width of the leaf. The mine of one larva assumes a pinkish tinge, of another brown, and that of adscitella is nearly white, and these are the stepping-stones towards the discrimination, at first sight, of the different species of larvæ. Some never venture into the stem, others do, the depths of their proceedings being only checked by the roots themselves. Then, again, whilst lying looking for these habitations, see the endless variety of other creatures which come upon the scene. Numbers of Apions and Sitonas crawl up the leaves, and after a long look at you, as if the sight of such a monster was too much for them, they suddenly seem to lose all power over their limbs, and drop apparently lifeless to the bottom. Once out of sight, this feigning, however, does not last long: up they come again, this time a little more fearless than before; and it is only when you make a movement in their direction that they repeat their little piece of juggling. Then there are numbers of Carabidæ mining about the roots, and occasionally Leistus rufescens may be met with running up the stems and leaves to have a look round and see what is doing. The Halticæ keep hopping about in all directions, and "cocktails," as the Staphylinidæ are politely termed, plunge into all sorts of holes and corners should their quiet be disturbed. Ichneumons, too, revel all over, in search of some poor unfortunates to act as nurses and be mothers to their fry; and the bugs drop down with a lazy whir-r-r, as if it was taxing their powers too much to make them use the appendages given by Nature for transporting them from one place to another. Besides these there are spiders of all shapes and sizes, black spiders and red, gray spiders and brown; some all legs and little or no body, others all body and little legs; some with the body as large as the head, and some all body and no head; while one little flat fellow has a pair of feelers stretched out in front for all the world like a pair of huge lobster-claws, and it seems immaterial to him whether he goes backwards or forwards. These are but a few of the many interesting little scenes to be met with on any summer's day and by any one. The great book of Nature is open to all. Her gifts are alike to each, munificent. There is no stinginess on her part; and, indeed, it very often happens that he who knows least about her fares best, as if she threw inducements in his way to call him from the forgetfulness in which he has hitherto been wrapped to scenes of wisdom, to a very "fairy land." I don't ask all to turn butterfly hunters because I am one; but I ask them to find something to do. Turn over some of Nature's pages; surely some of them have interest for you; so that in after years it may be a sweet recollection to refer to hours and days numbered amongst the happiest of your lives.

"Let Nature be your teacher;
Sweet is the love which Nature brings:
Our meddling intellect
Misshapes the beauteous form of things."

—*John Scott; Southfield Villas, Middlesbro'-on-Tees, December*, 1857.

Notices of New Books.

'*The Insect Hunters; or, Entomology in Verse.*' London: Newman. 1*s.* 6*d.*

* * * "Ballads that
Speak in tones so plain and childlike,
Scarcely can the ear distinguish
Whether they are sung or spoken."

From the date of our earliest acquaintance with entomologists and Entomology there has been a demand, universal, clamorous, always unsatisfied, for a "First Book;" a book that should induct knowledge into the minds of the uninitiated; a book that "he who runs may read." True we had Kirby and Spence's 'Introduction;' but, and we say it advisedly, that work really contains no introduction to the science. Volumes i. and ii. are, beyond a question, the most delightful reading that one need wish for; but we may read them again and again, we may digest and appropriate the vast amount of agreeable and instructive matter they contain, without stepping over the threshold of that temple which may be said to contain the arcana of the science. Volumes iii. and iv. are ponderously learned, and, shall we venture to say it? totally unadapted for a beginner. To the uneducated they are a sealed book, on account of their style and language; to the poor, and it is no disgrace to be poor, they are a sealed book, on account of their price; and so true are both these positions that we never hear of these two volumes unless some learned critic, once in the course of seven years, alludes to them for the purpose of pointing out some errors of explanation or arrangement which he thinks he has detected. The reprint of vols. i. and ii. in a condensed form, and at the amazingly low price of five shillings, is a boon on the part of Mr. Spence for which we cannot feel too grateful; this, which in all probability is the last public act of a long and useful life, will make him as dear to those who succeed us, as his truly catholic kindness has made him to all who have enjoyed the honour and the pleasure of his personal acquaintance. This cheap reprint has recommended Entomology in its most enticing form to hundreds who had never before known even the meaning of the word. If, therefore, Entomology be a science worthy of study, to Mr. Spence alone is due the merit of introducing it to a world of readers totally

inaccessible to the more technical and laboured productions of its votaries.

This reprint does not supply, but really seems to suggest, the want of a methodical introduction to the science. It shows you a well-stocked garden full of luscious fruit and bright flowers: the garden, too, is near at hand; you see it clearly and distinctly; but still there is around it a kind of invisible fence, which, while it hides nothing within, does not permit one to enter: an entrance-gate is wanting,—an entrance-gate that will admit you to the garden, that will meet the oft-repeated requiring, "Oh, how how I should like to know the first principles of the science." The 'Insect Hunters' is this entrance-gate; it is the very work to satisfy this requiring; and it is one of its peculiar merits that it will be as easily understood by the child as by the man. The instruction of children is an art, alas! but little understood; hence the necessity for such books as these, and hence their great value. Children will devour its pages, and thus instruct themselves; and parents need not be ashamed to be detected in learning from a book bought for their children. Let us never lose sight of the fact that we are all children in knowledge with regard to the unknown. Indeed, no mistake can be greater than to suppose that the hard-headed, thinking man, amid all his pressing avocations and cares, desires or requires that knowledge should be presented to him in an abstruse or difficult form. The exact converse of this is the truth. The chess-player in advancing years contents himself with the backgammon board; the mathematician and financier often become confirmed novel readers: whether young or old, whether we seek instruction or amusement, we like it to be presented to us in the easiest and most attractive form. The anonymous author of the 'Insect Hunters' appears to be cognizant of this fact, and has been at infinite pains to remove from his instructions all that is difficult or repulsive; his work requires no glossary; it needs no teacher to explain its meaning; it is in itself both glossary and teacher; it explains itself.

The style of the book will be explained to all who have studied, and who has not? Longfellow's beautiful 'Hiawatha,' when we say that it is a faithful imitation of that exquisite poem. From the 'Introduction' and 'Valediction' we cite the following passages, simply to exemplify the spirit in which the work is written: we leave the poetry to speak for itself:—

"Ye who love the face of Nature,
In the storm or in the sunshine,

In the deep shade of the forest,
On the high and naked mountain ;
Ye who trace the Maker's finger
In this world of his creation,
And look through this bright creation,
Through these Ios and Edusas,
These Sybillas and Machaons,
Through the hosts of minute creatures
Peopling every blade and blossom,
Up aloft to Him who made them ;
Ye whose hearts are fresh and simple,
And have faith in God and Nature,
Who believe with all your spirit
In benevolence eternal,
Inexhaustible and perfect ;
Ye who sometimes in your rambles
Through the green lanes of the country,
Where the Clematis and brier
Intertwine their arms in wedlock,
Pause to drink a draught of pleasure,
Far apart from all that's worldly ;
You I ask to read this Poem,
Read this short and simple Poem ;
Ponder o'er its peaceful teaching."

Introduction, p. 4.

" But in learning or instructing,
In receiving or in giving,
In that intercourse with mankind
Into which the path of Science
Must inevitably lead thee,
Must most innocently lead thee,
Mind in all things let the conscience,
Planted in thy breast by heaven,
Be thy rule and guide of conduct.
If through life we yield obedience,
Cheerful, without hesitation,
To that everpresent mentor,
That infallible director,
Then we find no cause for mourning,
Vain or unavailing sorrow :
Memory then, like placid moonbeams,
Sheds a soft and silvery lustre
On the days that have departed ;
Happiness, with smiling features,
Child of innocent employment,
Brilliant as the noonday sunshine,
Lights the now of our existence.

Lastly, like this glow of sunset,
Reddening the westward heaven,
Prelude of a fair tomorrow,
Hope illumines the hereafter."

Valediction, p. 81.

"All this has nothing to do with Entomology." Granted; nevertheless, it accomplishes what we desire: it shows the spirit in which the whole is written. We will now give a brief summary of the contents, selecting a single example of the author's power of adjusting the free and flowing phraseology of verse to the precise requirements of accurate description. The first chapter is entitled "the four stages," the egg, larva, pupa and imago. The author represents himself as leading by the hand an intelligent little girl eight years of age, and showing her the eggs of the vapourer moth; the caterpillar of Sphinx Ligustri; the chrysalis, in its cocoon, of the lacquey moth; and, lastly, as an imago, the common cabbage butterfly. As the two insect hunters, old and young, find these, in the course of a short walk, the elder explains to the younger all that need be known respecting them. The second chapter explains the seeming mysteries of metamorphosis, and the author founds his system on their differences. The third chapter describes the tribes of Lepidoptera; the fourth of Diptera; the fifth of Hymenoptera; the sixth of Coleoptera; the seventh of Stegoptera; the eighth of Neuroptera; the ninth of Orthoptera; and the tenth of Hemiptera. The names of all the tribes terminate in *ina*, producing a degree of uniformity that assimilates to that now universally employed in Botany. In giving entire the description of one of these tribes, and that perhaps the most awkward to deal with, we shall show the manner in which the author has mastered them all. We cite the "Gallflies."

"All the oakapples and inkgalls,
All the cherrygalls and nutgalls,
All the bitter Dead Sea apples,
All the beautiful oakspangles,
And those freaks of sportive Nature
Called by children wild mossroses,
Found in summer in the hedgerows,
All these, and a hundred others
Quite as strange, and some far stranger,
Are the work of puny insects,
That we always call the Gallflies,
Or in science Cynipsina.
These most wonderful formations,

Nurseries of Gallfly larvæ,
Little white and footless maggots,
Are not built by skill instinctive
Of the quiet pent up inmate,
Or its winged and wandering parent,
But are merely strange distortions,
Caused by buoyant sap diverted
From its true and proper channels;
Yet how uniformly fashioned!
How alike in size and figure
Those each kind of fly produces!
How unlike to every other!
All the Gallflies are small insects,
With antennæ very simple,
And with bodies flattened sideways,
And divided in the middle
Into nearly equal portions,
Called the abdomen and thorax;
And the female has a borer,
Almost all Gallflies are female,
With which instrument she pierces
Leaves or tiny twiglike branches,
Laying eggs within the fissure;
Her clear wings are almost rayless,
And her feet are all fivejointed."

P. 36.

This will give the readers of the 'Zoologist' a clear conception of the plan of the work. All the natural families of insects known in Britain are described in this exact manner; and no word, not even the familiar "antennæ," is used for the first time without an accompanying explanation. Thus it is impossible even for those small wits whom we so often find purposely mispronouncing a word, in order to show how difficult and how unintelligible is Science, — it is impossible, we say, even for them to make out their own case. The names, owing perhaps to the musical termination, adapt themselves wonderfully to the octosyllabic metre of 'Hiawatha,' which has doubtless been adopted on account of the facility with which it may be committed to memory. This facility is unequalled, as every one must have found who has read the original attentively: it seems to linger in the mind that makes no effort to retain it, and to mingle itself with our passing thoughts, whatever be their theme. Such an assistance is invaluable where so much depends on memory; and we cannot doubt that this alone, independent of its higher merits, will render the 'Insect Hunters' a lasting favourite with all who will con-

descend to consider themselves juveniles either in years or knowledge.

J. G.

On the Derivation of the English word "Mare," as explained by the Rev. P. H. Newnham. By THOMAS THOMPSON, Esq.

I HAVE been much pleased with the Rev. Mr. Newnham's remarks on the etymology of names of animals; but in one instance he seems to me to have run into the realms of fancy, both in deriving the word *mare*, a female horse, from the Celtic *march*, which he says means a war-horse (it in fact simply means a stallion), and in the reflections he indulges in, arising from what I conceive to be his false derivation of the word *mare*, under the remarks he makes on the horse.

The truth seems to me to be that our Saxon ancestors had an inferior breed of horses before the Normans came amongst us with their better breed. *Hors* was the Saxon name of the animal; *moere* is the female's Saxon name; *colt* the name of the offspring, both male and female, the former being distinguished as a *hors colt*, as it still is amongst our American cousins. When the Normans came and made serfs of our Saxon ancestors, the latter, who tended the horses, retained their own terms relating to them; but the Normans, the gentry of that day, used their own terms, which have descended, for the most part, to the upper classes of the present time. Their *cheval* gave the name *cavalry* to their horse soldiers: those who kept and rode horses were chevaliers; but in the instance of the name of the animal the Saxon grooms and horse-feeders seem to have come off conquerors, and *cheval* succumbed to *horse*, which we still use. The better breed of Norman horses had probably the same pains bestowed on their pedigrees as our modern race-horses have. In that superior breed the male was, as at present, called by the Norman term *sire* (the father), the female by the term *dam* or *dame* (the lady). *Colt* seems to have then been applied to the male offspring only, dropping the compound word *horse-colt*; and to the female offspring the Norman word *filly* (*fille*, a daughter) was applied. The dam, when thus become a mother, was called by the Norman word *mère* (a mother), now spelt *mare*, agreeably to the English *sound* of the French *mère*. This may also have been occasioned by the great similarity of the Saxon appellation *moere*, also signifying a female horse; and it is

singular that where the Norman and Saxon words were so much alike they did not amalgamate into one common sound; but to this day, in Yorkshire and the northern counties, where the Saxon and Danish pronunciation of words is still predominant with the lower orders, the female horse is, amongst the latter, always spoken of as "the meer;" whilst the upper classes pronounce it "the mare," just as our Saxon and Norman ancestors respectively did in their day. The Saxon word *fole* (now *foal*) seems to have kept its ground as a general term for the offspring of horses which (after colt had become confined to the male) were called, as males, colts or colt-foals, and, as females, fillies or filly-foals.

When we see how naturally the word *mare* comes from the Norman *mère* and Saxon *moere*, whence all our other words relative to horses are derived, I think we have no occasion to resort to the far-fetched word *march*, Celtic for a stallion (or war-horse if you will), for a derivation.

A dray-horse, no doubt, through a number of changes, has its ultimate root in the words *to draw;* but its proximate derivation is from the horse's employment in propelling the carriage, used by brewers, called "a dray:" that word, no doubt, is based on the words *to draw*.

These remarks, perhaps, are scarcely fit for the 'Zoologist;' but I have been led into them by having pen, ink and paper before me whilst reading page 5359 of that excellent periodical; so, being written, I send them.

THOMAS THOMPSON.

Hull, January 8, 1858.

[I may remark that, without the slightest pretension to etymological research, I had always considered the French "*mère*" and English "mare" strictly synonymous as applied to the female horse; thus, in France, we continually hear the term *mère et poulain*, "mare and foal," although our dictionaries give no such expression. I believe we shall be quite safe in accepting the English word "mother" as the meaning common to the two. Still the origin of the two words meaning "mother" may be an open question, and I quite incline to agree with Mr. Thompson in discarding the word *march*, or stallion, as that origin.—*Edward Newman.*]

Proceedings of Natural-History Collectors in Foreign Countries.

Mr. Louis Frazer.—Mr. Louis Frazer left England in August last to proceed to South America, for the purpose of collecting objects of Natural History in the mountain-valleys of the republics of Ecuador and Peru. Mr. Frazer left by the West Indian mail steamer on the 17th of August; arrived off Colon, 10 A.M., on the 9th of September; crossed the isthmus next day to Panama by railway * in five hours and a half; on the 15th embarked on the Pacific S. N. Co.'s packet "New Grenada," and reached Guayaquil on the 20th at daylight. The following are extracts from his letters.

Guayaquil, September 29.—My boxes are all on board the chatter, or large flat-bottomed boat, which will carry them down the Guayaquil river and up the Naranjal. 9 A.M. I saw Sr. Oreallana, who said he was going on board, hastened to get my box, containing bread and brandy for the road; by the time I got to the river (not more than five minutes) the chatter was well in the river; hailed,—no answer. After some delay, secured the captain of the port's boat, and followed. We were gone about two hours, but could not find her in the dark. Until one o'clock next morning I was endeavouring to hire a boat to follow, but without success.

30th. Mr. Mocatta and self were hunting all day for a boat; at 7 P.M. procured one for thirty dollars; at 7.30 P.M. started with a strong tide and four oars; at 11 P.M. arrived off the upper end of the Island of Puna for the night and tide.

Oct. 1. 8 A.M. Off the Naranjal river, bar quite dry. Had to wait the tide. Some rain. About Puna and up the Naranjal river there are magnificent mangrove trees, apparently forming splendid forests; trees thirty and forty feet high and thick in proportion. The Naranjal is not more than thirty or forty yards wide anywhere. 3 P.M. arrived at the station called Naranjal Port,—it cannot be called a village, as it has only one house and two or three miserable huts scattered about. Plenty of birds and lots of filth. On the banks of the Naranjal we saw numerous alligators sloping into the water at our approach; but there was one party of upwards of twenty-four which never moved;

* Colonel Totten, the chief engineer and director of the Panama Railway, upon hearing who Mr. Frazer was, and the objects for which he was travelling, immediately granted him a free pass for himself and his baggage over the railway, thus saving him an expense of upwards of £20.

one or two of them opened their mouths, but I could not hear what they said.

Sr. Oreallana, my cicerone, says the captain of the chatter was drunk, and went away without him, and that it cost him four dollars for a canoe to overtake her.

2nd. Planked it for the night, which was very cold. I have a bit of a cough and a nasty cold. Much rain. 12 P.M. Started on horses. The road was entirely through the bush, with the exception of one chocolate plantation, in bad order. Arrived at the town of Naranjal at 2.15 P.M. Naranjal is rather large; the houses are built separately and on sticks, with split bamboos for walls. The people, for the most part, appear dirty, and the place corresponds. All through this country they tie pigs up by the neck, as we do dogs.

3rd. 8 A.M. Having procured mules, we started in pouring rain, and I had only white duck trousers on, as I was given to understand that the box with my woollen things was gone on ahead. They used one of my blankets for a mule-cloth and the other for a saddle-cloth. Passed through bush, and arrived at a rancho, kept by a young white couple, on the side of a torrent: being wet through, made an ineffectual attempt to dry my external clothing. Half-past 11 A.M. Rain abated. Started again. Crossed the torrent four or five times and over two or three ridges; arrived at an open shed called "The Mint," from a species of wild mint that grows there. We have been travelling in the mountains for about an hour after dark: I can only say it was not pleasant, the road being bad enough by daylight. Felt as if I had ague.

4th. Took chocolate. Had some little difficulty to make the mules take the right direction, and no wonder, for the road was even worse than yesterday. Morning cold. Started at 7 A.M. I should have stated that "The Mint" was situated on a little plain amongst the mountains, with a rivulet running through it. 10 A.M. Arrived at Molleturo Pueblo, a pretty valley, with a few Indian huts scattered about. Church was going on. In the church the fiddle, drum and triangle were playing gaily anything but psalm tunes. After crossing two or three water-courses or torrents we arrived at a place called Meeweiss at 5 P.M.: this is the best-looking farm or rancho which I have seen, having stone walls and wicker fences all round about, but the house, as usual, was very miserable. Here we stopped for the night. Half-past 5 P.M. A mist or cloud, like a London fog, swept quickly through the valley, making almost night of it; with it came a very cold wind.

5th. 6 A.M. Started. Traversed valleys all day, the greater part through bog. At a quarter past 2 P.M. this day we stopped at an Indian hut, and requested food on payment; this was refused; there was a great war of words; at last Oreallana struck the Indian in the face, and I expected a fight would ensue; but no,—the Indian went away, and ultimately his wife made us a meal, such as it was. This, they tell me, is the usual way of getting what you require *en route*. During this squabble there were several men and women, travellers, looking on, but no one interfered. Some part of this day's journey was very cold, but not so much so as I had been led to expect. The mountains here are nearly barren, and have the appearance of gigantic Islands of Ascension. Contented myself with two raw eggs and a glass of water, which I got at a place called Potosi, and turned in for the night.

6th. Rain in the night: morning beautiful, cool and comfortable. Had the pleasure of seeing a longtailed, green-throated humming bird flitting from flower to flower, close to the shed in which I slept: the male came first, and, when he had been gone some little time, the female came: this looks like breeding, although they say this is not the season. The woman of the hut made me some breakfast, and at ten minutes to 9 A.M., started on a pony, and arrived in Cuenca about half-past 10 A.M. Why we did not come in last night is more than I can say. The muleteer left me in a house in town, bid me "adios," and rode off. I had been here about an hour, and was just thinking I might remain and starve, when I heard footsteps approaching and the sound of English; they proved to be Colonels Talbot and Harris, who, having heard of my arrival, had come to see who it was. My travelling companion had orders in Guayaquil to introduce me to certain persons, but he deserted me last night, so I had to introduce myself, when Colonel Talbot told me that the house I was in was his, and that I might remain with him as long as I pleased. And here I am, nearly 3000 feet above the sea. Cuenca seems surrounded for miles by apparantly well-cultivated farms; the corn is ripe, and for the most part cut and carried.

15th. Went out shooting; but the roads are so intolerably bad that I am compelled to give it up until I can procure a mule. Mud, water and loose boulders are not pleasant travelling amongst. The remainder of my boxes arrived. The road from Guayaquil to Cuenca, for the most part, may be likened unto travelling up and down deep dirty ditches or rucks, with stones stuck in every possible position to impede your progress or knock your toes, shins and knees against:

other portions are open water-courses, either with or without water, according to circumstances or seasons; and, even in the more level places, which are "few and far between," the stones seem placed on purpose to puzzle the mules to know where to find a footing: the ascent is frequently two feet in three: add to this a stone every now and then, from 18 to 24 inches in height, to be ascended or descended according to circumstances. The only wonder to me is how the beasts ever managed to get over the road.

The first day was for the greater part through magnificent forests, the trees almost covered with orchids; the second day the trees became more stunted, and the orchids not noticeable, but almost every hour produced some beautiful flower new to me; the third day was through almost barren mountains, at times presenting a view, on looking up, of several hundred perpendicular feet of bare rock. I saw but few birds and not any mammals *en route*.

Cuenca, October 21, 1857. This time I have not much to say. I am busy fixing up to join a merchant, who has promised to take me with him (I say "promised," for, until the thing comes off, I have no faith in anybody here) to Gualasio, about twenty-seven miles eastward from here,—a cane country. After a few days' stay in that place, we are to proceed to Gualaquisa, about eighty miles further on to the E.N.E., but on the eastern side of the Andes,—a Caskarilla country, where I hope to meet with novelties. In this place I have been exceedingly disappointed; specimens of all kinds are scarce,—species still scarcer. I have only obtained about thirty species of birds, and these of no great account, although I have been out every morning, weather permitting, and have hunted all round the town for some four or five miles; moreover, I believe I have nearly all the species to be found here, at any rate at this season. I have only three or four Mammalia. I have three or four genera of shells, but only two kinds of which I could get any number. Insects are very, very scarce: all this perhaps owing to the entire neighbourhood being cultivated.

Louis Frazer.

Note on Mr. Wallace's Travels.—It appears an object much to be desired by lovers of Natural History that (if possible) before Mr. A. R. Wallace returns homeward from the Eastern Islands, where he is so zealously pursuing his researches, his attention should be directed to Siam. The Fauna of that country is at present quite unexplored, but there is, I think, reason to anticipate that it will richly reward a close scientific investigation. It is the native land of the (so-called) "white elephant," and it possesses an extraordinary amphibious fish, which may be seen by persons passing on

the river, when the soil is wet, gliding over the bank into the jungle. As yet Siam is almost unknown, but several years ago a Mr. Neale published (in, if I recollect right, the series styled the "National Library") a little work descriptive of a residence there of some duration, and last year produced 'The Kingdom and People of Siam,' in two vols., by Sir J. Bowring, the result of his official mission thither in his way to China. Not only are both these accounts curious from the peculiarities they exhibit, but they agree in giving a most interesting and very hopeful view of the present enlightened rulers of Siam, who certainly are perfect anomalies among the despotic sovereigns of Asia. Neither of the above-named authors is a naturalist, but the latter states that the country on both sides of the great central river, the Meinain, to some distance above the capital, Bangkok, is generally an impenetrable forest, abounding, however, in animals, of which elephants, tigers, deer and monkeys are, I think, especially enumerated. The upper portion of the kingdom is more open. Foreigners cannot range the country without permission, in obtaining which, however, little difficulty is likely to occur (unless the recent treaty and professions of amity prove mere "moonshine"), and the inhabitants are not hostile to Europeans. Should any fortunate explorer discover a white elephant, or even a white monkey, great would be his luck; but to kill either would be ruin. Sir J. Bowring considers Siam, as a tropical country, very healthy. PS.—Mr. Wallace mentions (Zool. 5893—4) the annoyance to himself, and the injury to his entomological collection, occasioned by ants and other small insects. Very possibly this inconvenience might be prevented by the means found effectual in protecting furs from moths. During the Great Exhibition a lady, one of my own family, asked the person in charge of the Russian furs how they preserved their wares from being damaged, when she was informed that their practice was to distribute quills inclosing small quantities of quicksilver among the furs.—*Arthur Hussey; Rottingdean, January* 18, 1858.

Proceedings of Societies.

Entomological Society.

January 4, 1858.—W. Wilson Saunders, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Nota sul genere Opsebius fra i Ditteri Enopidei;' presented by the Author, Achille Costa. 'The Canadian Journal of Industry, Science and Art,' N. S., Nos. 11 and 12; by the Canadian Institute. 'Descriptions of eight new Species of Entomostraca found at Weymouth;' by the Author, John Lubbock, F.G.S. 'The Zoologist' for January; by the Editor. 'Memorias de la Real Academia de Ciencias de Madrid,' Vol. iv.; by the Academy. 'The Athenæum' for December; by the Editor. 'The Literary Gazette' for December; by the Editor. 'The Journal of the Society of Arts' for December; by the Society. 'The Insect Hunters;' by the Author, Edward Newman, F.L.S. 'The Entomologist's Annual' for 1858; by H. T. Stainton, Esq.

Exhibitions.

Mr. Janson exhibited a root of Monizia edulis, *Lowe*, from Dezertas Island, near Madeira, where it is commonly known as the "wild carrot." Although brought to this country in May, 1857, since which time it had been kept in a dry room, it still exhibited traces of vitality, and was infested with a species of Coccus.

Mr. Waterhouse exhibited to the Meeting his extensive series of the British species of Atomaria.

Mr. Douglas exhibited a portion of one of the staves of a flour-barrel, perforated by the larva of a Rhizopertha, apparently an undescribed species. All the softer portion of the wood (American oak) was completely eaten away, and considerable leakage and loss of the flour had taken place in consequence.

Mr. Stevens exhibited some Lepidoptera, lately received from Mr. Bates, taken in the neighbourhood of Ega and on the river Janari, Upper Amazons. The collection contained Papilio Columbus, P. Bolivar, P. Patros and P. Pausanias, some splendid Catagrammæ and Erycinidæ, and a number of fine Geometridæ. The most interesting portion of the collection, however, was a series of minute Lepidoptera, which had arrived in the most perfect state of preservation, and included many most beautiful and remarkable species, especially amongst the Pyralidæ and Œcophoridæ. The collection also contained several species of Pterophoridæ closely resembling the European representatives of that family.

Captain Cox announced his intention to call the especial attention of the Society, at the next Meeting, to the fearful ravages committed by the Scolyti on the elm trees in the vicinity of the metropolis.

Mr. Stainton read a "Synopsis of the Genus Elachista."—*E. S.*

The following paper, by Mr. Janson, was read at the Meeting of July, 1857:—

Occurrence of Scolytus rugulosus near London.

"S. rugulosus (*Koch*), *Ratzeb. die Forst. Insecten*, i. 187 (1837), has been reared in considerable numbers from the dead branches of a pear tree, gathered by Mr. Groves in his garden at Lewisham, and not hitherto recorded as British. The question has been more than once discussed in this room whether the Scolyti attack healthy and vigorous trees, or whether they select as a nidus such trees only as are already diseased,—whether, in fact, they are the primary or merely an accessory cause of the devastation which has been attributed solely to them. Each view has found warm and able advocates, but I believe the question still remains open, nor can I aspire to close it, but I think, as far as the species now under consideration is concerned, we may fairly conclude that, under ordinary circumstances, its pabulum consists of *dead* wood, since Mr. Groves informs me that it is on the upper dead branches alone that the insect is to be found, no trace of it being discernible on any other part of the tree; and, in fact, the branches which he has placed in my hands, and from which the specimens now exhibited were reared, present every appearance of having been destitute of vitality for several years. The present species, however, departs considerably in habit from that of its congeners which I have had an opportunity of

studying (destructor, *Oliv.*, intricatus, *Ratzeb.*, and multistriatus, *Marsh.*, *Ratzeb.*), whose larvæ subsist chiefly on the inner bark, occasionally only attacking the sap-wood in their progress, and, when full-fed, assuming the pupa state at the end of the burrow, or in a very shallow cell excavated in the sap-wood; whilst, on the other hand, the larvæ of the insect now before us appear to derive their chief sustenance from the solid wood, into which they penetrate deeply, the outer surface presenting only faint traces of erosion.

"The genus Scolytus, first instituted by Geoffroy, but to which our continental brethren persist in applying the more recent generic appellation of Eccoptogaster, proposed by Herbst, at present contains upwards of a dozen described European representatives, all of which subsist upon trees indigenous to or generally cultivated in this country. Of these five only are at present known to me as natives, viz.,—1. S. Ratzeburgii, *mihi*, Ent. Annual for 1856, p. 87 (destructor, *Eric.*, *Ratzeb.*, nec *Oliv.*), frequenting the birch, and probably confined to the northern portions of our island; 2. S. destructor, *Oliv.*, abundantly distributed throughout the southern and central portions of England, and which attacks the elm, confining itself, however, to the trunk and large limbs; 3. S. multistriatus, *Marsh.*, *Ratzeb.*, also peculiar to the elm, where it is occasionally found in company with the preceding, but more generally alone and in the small branches; 4. S. intricatus, *Ratzeb.*, a denizen of the oak, and, according to my experience, attacking the branches only; 5. S. rugulosus, *Ratzeb.*, the species now before you, and which, as we have seen, inhabits the smaller branches of the pear tree; on the Continent, Ratzeburg informs us, it occurs in plum and apple trees. Ratzeburg (*l. c.*) has thus divided the genus:—

§ 1. Abdomen beneath, in at least one of the sexes, with tubercles or teeth.
§ 2. Abdomen beneath without tubercles or teeth.

Of the ascertained British species, Ratzeburgii, destructor and multistriatus pertain to the first section, intricatus and rugulosus to the second. S. rugulosus may be at once distinguished from its near ally (intricatus) by its smaller size, deeper, coarser and rugulose sculpture, and by the punctures on the interstices of the elytra, arranged in regular rows, being of equal depth and size with those of the true or normal striæ; in rugulosus, moreover, the apex of the elytra is usually more or less broadly red. I would further remark that the beautiful series of specimens, which I owe to the kind forethought of Mr. Groves, has enabled me to determine a solitary individual in Mr. Wollaston's collection, taken by that gentleman, several years since, at St. Neot's, and which has long caused me much perplexity, but which I have now no doubt is referrible to the S. rugulosus. In conclusion, I would earnestly recommend this genus to the careful attention of my brother entomologists, as offering an ample field not only for the discovery of new species and the augmentation of their collections, but for elucidating a question of vast importance to the community at large, and to which I have already adverted."

At the Meeting of November, 1857, Mr. F. Walker read the following

Notes on Aphis Quercus.

"Having lately taken a few specimens of the Aphis Quercus of Linneus, I beg leave to offer to the Entomological Society a few notes on that species. It was first discovered by Mr. Ingall, in 1847, on an oak at Dulwich; Mr. Smee found it soon

afterwards at High Beech, in Epping Forest; and about a month ago, when I happened to meet him, he told me that he had just observed it on an oak at St. George's Hill, Weybridge. He kindly directed me to the spot, and after some search I found the oak tree by a foot-path in the wood, and in the neighbourhood there were two other oak trees also infested by the Aphis. The presence of the latter is detected by the numbers of the black ant which come to feed on the honey, and whose multitudes much add to the trouble of extracting the Aphis, for its body is so soft, and its rostrum is buried so deeply in the bark, that it must be cut out of the tree carefully, in order to avoid crushing it. I then wrote to Mr. Ingall, and asked him some questions respecting the structure of the rostrum, and he with much kindness lent me all the specimens which he had preserved in Canada balsam, fifty-five in number, and his MS. notes, from which I have extracted nearly all the following observations.

"The Male.

"This is apterous, like the males of many other species of Aphis, and appears about the beginning of October, and continues till November. It is less than one-fourth of the size of the female, and about twice the size of the egg (which is large), and has no appearance of any mouth either in the young or in the adult state. In other species of Aphis the mouth has a like structure in both sexes.

"The Winged Female.

"This lives early in the year, and seems to be scarce. It does not possess the long rostrum which distinguishes the following form, and is very different from it in appearance.

"The Wingless Female

has a rostrum which is more than twice the length of the body, and in the young insect is more than four times the length of the body. It seems to be quite distinct from the true mouth, which possesses three extremely slender setæ (the middle one double); these are received into the groove of the rostrum or tube, and rather exceed it in length. The rostrum is fitted into a 'sac at the base of the lower lip, which sac probably extends nearly the length of the body;' it can be folded? and is often contracted to half its usual length, and more rarely to one-fourth of its usual length, and may be seen retracted within the body to the base of the fore legs, or to the base of the hind legs, or even to the tip of the abdomen. The joints, also, of the rostrum can be withdrawn one within another, like the parts of a telescope, and the whole apparatus is peculiarly adapted for the extraction of the sap of the oak between the rugged clefts of the bark. The eggs are deposited in October and November.

"I will endeavour to make further observations on this species during next year, and hope that in the meanwhile some person will kindly undertake to dissect it, in order to ascertain fully the structure of the rostrum, and how it is received into the body."

Northern Entomological Society.

December 26, 1857.—B. Cooke, Esq., in the chair.

Election of Members.

Mr. John Sang, of Darlington, and Mr. T. Wilkinson, of Scarborough, were elected Members.

Exhibitions.

Mr. N. Cooke, on behalf of Mr. Archer, Surgeon of the "Great Britain" steamer, exhibited a box of Australian Lepidoptera, principally Sphingidæ and Bombycidæ, captured by Mr. Archer during his last journey.

The Secretary, on behalf of Mr. Brewer, of Reigate, exhibited a box of Coleoptera, in which were six Cicindela germanica, Tarus axillaris, Callistus lunatus, &c.

Mr. Carter exhibited a dark-coloured variety of Arctia Caja, in fine condition; a perfectly brown variety of Halia wavaria; a malformed specimen of Hydrophilus piceus, with a *spine* on the right side of the prothorax; a specimen of Monohammus Sutor, and another of M. Dentator, taken at Manchester this season; and lastly, a specimen of Clytus erythropus, a Mexican species, which has been found in Manchester.

Mr. Carter then called attention to a copy of 'Fabricia Entomologica,' written by his friend Mons. H. Jekel. He strongly recommended it to the members, and requested their Secretary to note its title, which is as follows: 'Fabricia Entomologica; par H. Jekel, Membre de plusieurs Sociétés Savantes Nationales et Etrangers, Paris Autographie Typomorphe de l'Auteur, 17, Rue des Saint Pères, 1854.'

Mr. Almond exhibited a specimen of Phibalapteryx gemmaria, captured on a lamp at Birkenhead, October 14, 1857; the specimen was in beautiful condition: the Secretary observed this was the fourth specimen which had been taken near Birkhenhead; two by Mr. Diggles, in Walker's Lane, in June, and one by Mr. Brockholes, in poor condition, at the end of July or in August, the exact locality not known; these, with one taken by Mr. Greening, near Warrington, in June, were all he had seen taken in the North. He then exhibited Heliothis armigera, taken at Bromborough on the 15th of November last, and a specimen of Phragmatobia Menthastri, taken on the 14th of October: it was observed that several early species had appeared during the past autumn, quite out of the regular course: this led to a discussion on double-broodedness; the result of which was that several species supposed to be double-brooded were proved to be continuous appearances, since in most of the species considered double-brooded, larvæ of all sizes and the perfect insect on the wing could be taken on the same day. Mr. Greening and Mr. Cooper observed that from Notodonta larvæ, taken in August and September, they have had a constant succession of perfect insects coming out in their cages from spring to autumn.

The Secretary exhibited a box of insects from Mr. Machin, of Globe Fields, London, in which were beautiful specimens of Laverna Raschkiella and Laverna conturbatella. He also exhibited a box from Mr. Wilkinson, of Scarborough, principally Micro-Lepidoptera, the most interesting species among which were Lithocolletis Amyotella, irradiella and Nicella, Bucculatrix cidariella, Demaryella and cristatella,

Nepticula angulifasciella, Tityrella and subbimaculella, Trifurcula immundella, Laverna propinquella, Gelechia acuminatella and viscerella, Coleophora troglodytella, murinipennella and juncicolella, and a magnificent specimen of Stigmanota lunulana, all taken or bred by himself this season.

The Secretary then exhibited a box from Mr. Dutton, of Hammersmith, in which were two fine specimens of Nonagria geminipuncta, taken last summer, observing that it was generally represented by dealers that this species was exterminated at Hammersmith Marshes, but such was not the fact; a series of Acentropus niveus taken by E. Brown, of Burton-on-Trent, on the river Trent, where Potomogeton pectinatus was plentiful, and a dozen Pterophorus lithodactylus taken by himself near Heabone; and a box from Mr. Reading, of Plymouth, in which were four of the finest specimens of Heliophobus hispidus: also a box in which was Glæa erythrocephala, which Mr. N. Cooke observed had very little resemblance to the continental specimens of this species in his cabinet of European Lepidoptera, but it was remarked in Mr. Reading's letter that it represented the variety glabra of Duponchel, as did also the specimen taken by Mr. Cooke, of Brighton.

An interesting discussion ensued upon the necessity or advisability of naming varieties, the Rev. H. H. Higgins contending for it, and being opposed by other members. The Secretary produced a series of varieties in his cabinet to show how useless such a course would be, as the same variety could rarely, if ever, occur again; in some genera the Rev. Dr. Hume observed, perhaps it was advisable only to name permanent varieties: this led to the old question of what is a species? and many scientific and some humorous remarks resulted, the question 'remaining open' for further discussion at another time.

Then followed the exhibition of two more boxes from Mr. Reading containing Coleoptera: in the first was a beautiful pair of Meloë brevicollis and a fine pair of Carabus intricatus; the most interesting species in the second box were Drypta emarginata, Leistus montanus, Elaphrus lapponicus, Panagæus quadripustulatus, Chlænius holosericeus, Stenolophus elegans, Hydroporus marginatus, &c.

The Secretary then exhibited a box of Lepidoptera, collected in Australia by Mr. Diggles, and sent as a present to his friend Mr. Warrington. Amongst them were representatives of the following British genera: Satyrus, Polyommatus, Eulepia, Sphinx, Procris, Euthemonia, Stauropus, Phragmatobia, Agrotis, Pyralis, Asopia, Chlorochroma, Coremia and Acidalia; Peronia was well represented, one species nearly allied to, if not identical with, our comparana; Sericoris, Eupœcilia, Xanthosetia, Cochylis and Tortricodes; in Tineina, Lampronia, Anesychia, Tinea and two species of plumes, one allied to our bipunctidactylus, and the other to our pentadactylus, but smaller.

After which was exhibited for Mr. Constantine, of Blackburn, a large box of Geodephaga, captured by him in Lancashire, illustrative of a paper upon specific differences, which was afterwards read for him by the Secretary.

In the genus Trechus, discus, micros, lapidosus and rubens were sent: a number of Pterostichus, including P. Æthiops; P. orinomus and nigrita were also sent to illustrate the paper, as were Amara orichalcica, rufocincta, brunnea, &c.; and among the Bembidia were rufescens, femoratum, bruxellense, lunatum, decorum, stomoides, monticulum, prasinum, pallidipenne, &c., forming a series well worthy of attention. Mr. Constantine also sent a copy of a list of British Rhynchophora (Walton's Nomenclature), which he had got printed to facilitate exchanges.

Mr. Gregson exhibited Eupithecia helveticata, bred from a pupa presented to him by Mr. Wilson, of Edinburgh, and the pupa-case of the same; the perfect insect appeared on the 23rd of December, having been kept in a warm room. After which he exhibited six specimens of Pterophorus Loewii, *Zell.*, taken at Southport, principally by Mr. and Mrs. Davis.

It was observed, whilst on the subject of new species, that it often happened that what were thought new species by one person were well known to others; and the President remarked this was the case with Mr. Edleston's Nepticula Myrtilli, he having had it in his cabinet for years, from Pettypool Wood, Delamere Forest. A member observed here was a singular instance of neglect to name and describe an insect, for fear it might possibly have been named in some out-of-the-way place or other, whilst it was well known we had not anything like it in our British lists; and also of anxiety to name, as expressed in Mr. Edleston's note in the 'Zoologist,'—this species having actually been named before it was bred or seen by the namer.

Mr. N. Cooke brought a box of Zygæna Minos for distribution among the visitors and members.

Reports of the Society's 'Proceedings.'

The Secretary read letters from a number of gentlemen who were desirous of seeing the Proceedings of the Northern Entomological Society published regularly in the 'Zoologist;' they were under the impression that the Society met monthly and that the Secretary had neglected to forward the reports. He had replied to them that the Society met only once in the quarter.

The Secretary also read a letter from the Rev. J. Greene, requesting him to forward the reports to the 'Naturalist' as well as to the 'Zoologist.' In submitting this question to the Meeting, he (the Secretary) observed that he did not keep a clerk, and that he had such extensive correspondence amongst naturalists generally that, unless the Meeting particularly wished it, he would rather not comply with the request. The subject was then allowed to drop.

The following paper, by Mr. W. L. Constantine, of Blackburn, was then read by the Secretary:—

On Specific Distinctions.

"I now send you my paper upon the differences of the allied species of Coleoptera of which I have sent specimens, and from the want of a knowledge of which I have in several instances found the more rare species placed among the allied common species. As my principal aim is to enable the coleopterist to recognise them when out collecting, and thus prevent waste of time, I have endeavoured to show the most prominent differences, some of which can generally be observed even whilst the little creatures are struggling to regain their freedom. I have not in all cases drawn the comparisons between the nearest allied species, but between the most closely allied species which I have taken in Lancashire and sent in the box. All the statements with respect to the rarity or otherwise of the species referred to apply only to my own observations in this country. If I have failed to make myself understood, it may arise from want of practice, for though I find no difficulty in separating any of the species sent, I find great difficulty in transferring my observations to paper, so leave the matter in your hands.

"*Dyschirius nitidus, D. salinus* and *D. globosus.* These three species are very distinct, and cannot be confounded with each other. Banks of Ribble.

"*Dyschirius impunctipennis?* and *D. thoracicus* in general form resemble each other, but are easily distinguished by the anterior tibiæ: in the first, they have externally two very obsolete teeth, and the external spine at the extremity is incurved; whereas, in D. thoracicus, they are externally very acutely dentate, and the terminal spine is curved outwardly. There are other differences, but these are quite sufficient to separate them at sight. D. thoracicus is common on the coast below Preston. D. impunctipennis? may be taken by scraping the sand where small burrows are seen in the damp bottoms, amongst sand hills at Wallasey on our coast in May: these burrows are best seen after rain, when the sun has dried the raised sand, which it does in a few minutes: they will be found close to the surface. Here also will be found the hitherto scarce, but here abundant, staphyline, which seems to be the principal food of the Dyschirius: on disturbing one of the burrows in which are both insects, the Dyschirius seizes the staphyline in his mouth, and then looks vastly like an ant carrying its load.

"*Pterostichus Æthiops.* This species may be distinguished from small specimens of P. madidus by the form of the elytra, which are narrowed in front and dilated behind the middle; whereas in D. madidus they are as nearly oval as possible; the difference is best seen on the under side. Scarce. Pleasington and Revidge, near Blackburn, in March.

"*Pterostichus orinomus.* This species, at first sight, resembles P. nigrita very much, but is readily distinguished by the elytra being obliquely sinuated and narrowed at the apex; it has also five or six deep impressions irregularly placed on the third interstice, but P. nigrita has only three, and they are not so deeply impressed as in P. orinomus. I have only met with it on the moors near Accrington, where it appears to be very scarce.

"*Amara orichalcica, A. brunnea* and *A. rufocincta* belong to the section with legs and antennæ entirely red, but are the only species which have the margins of the thorax red. D. orichalcica is easily distinguished by the apex of the elytra being testaceous. There is no perceptible difference between A. brunnea and A. rufocincta; the distinction is said to be in the form of the mentum: as we cannot dissect in the fields, it is best to take all; it is probable they will eventually be united as one species. I took a pair of A. orichalcica running on the foot-path near some gardens in Blackburn. The A. brunnea or A. rufocincta in the box is the only specimen I have taken. Near Preston.

"*Trechus Discus* and *T. micros.* T. micros is much duller coloured than T. Discus: it is also narrower in proportion to its smaller size, and the dark patch on the elytra is never distinctly defined: in A. Discus the dark patch is always conspicuous. Both generally distributed on the banks of the river Ribble, but rather scarce.

"*Trechus rubens* is easily distinguished by its general darker colour, &c. Banks of the river Darwen. Scarce.

"*Trechus lapidosus* is easily distinguished by its larger size and flatter and broader elytra. Banks of river Ribble. Very scarce.

"*Bembidium rufescens* is easily distinguished. Not uncommon. Banks of river Ribble.

"*Bembidium bruxellense* and *B. femoratum.* These species are very closely allied: in B. bruxellense the thorax is broader, and the foveæ much larger, with the space

between them distinctly punctate; the elytra are wider and the sides more rounded; the punctured striæ deeper, and the spots are generally smaller and more obscure; the antennæ have one basal joint entirely, and merely the base of some of the following ones, red, whilst B. femoratum has two joints red. B. bruxellense occurs on the banks of the Ribble and Morecambe Bay. B. femoratum generally distributed.

"*Bembidium lunatum* is easily recognised by its large size and semilunate testaceous-red spots at the apex of the elytra. Banks of Ribble. Not uncommon.

"*Bembidium decorum* is easily distinguished by its very elongate form. Banks of Ribble. Rather scarce.

"*Bembidium stomoides.* This species may be recognised by its similarity in form to Stomis pumicatus, whence its name. First introduced into the British Fauna in Dawson's 'Geodephaga Britannica.' Locality, Cumberland. I have taken it on Lytham Sands, and banks of Ribble.

"*Bembidium monticulum.* This species may be separated from any of the green section by its elytra being so very much broader than the thorax, which is small in proportion. Banks of the Ribble; generally distributed.

"*Bembidium affine.* Very closely resembles B. nitidulum, but may be distinguished by its palpi being entirely testaceous, whereas in B. nitidulum the penultimate joint is brown; in B. affine all the joints of the antennæ are longer, the thorax shorter and more square, and the elytra broader and more rounded on the sides. Ribble banks; either scarce or overlooked.

"*Bembidium prasinum.* This species is soon distinguished from B. tibiale by the striæ on the elytra not being punctured, and by its much wider thorax; the legs are also wholly black. Banks of the river Ribble; few specimens captured."

The following paper was then read, by the Author, Mr. B. Cooke:—

On Classification.

"Mr. Dallas, in his 'Elements of Entomology,' after stating his reasons for the adoption of the Cibarian system of classification in his work, says (p. 58), 'But, for my own part, I must confess that I think the adoption of the metamorphosis as the foundation of the arrangement of insects leads to a more philosophical result.' Coinciding with Mr. Dallas in this view, the object I had in the present paper was to carry out this system of arrangement, and to endeavour to show that the orders of insects follow one another in a more natural and regular course than in the system of classification which is founded on the structure of the mouth.

"It struck me, however, that a short review of the subject of classification generally, not merely of insects but of all animated nature, would be an important step in the inquiry. The object of all classifiers has been to arrive at a natural system; and, as Nature is said to be formed on a plan, it seems to me that there ought to be one and the same plan throughout in the arrangement of each class of animated beings. The plan which will be here advocated is simply this,—to begin with the highest development, and proceed in regular gradation to the lowest; to commence each class, each order and subdivision, each family, each genus, with that animal which should hold the highest rank in its respective group; to proceed from the most powerful down to the most defenceless, from the most noble to the meanest;—care being taken to associate together those which have a close affinity throughout the various stages of their existence.

"It is obvious that carnivorous animals, those which prey upon others belonging to the same order as themselves, will possess the highest development; their muscular powers in proportion to their size, their strength of bone and of jaws, and their agility, are all necessarily greater than those of animals which they have to subdue and subsist upon. The predaceous tribes, then, in each class and order, whenever such exist, should be placed at the head. Thus in the Mammalia, the lion, the tiger, the leopard, &c.; in the Birds, the eagles and falcons, will claim the highest rank; and, indeed, such is the position, or nearly so, commonly assigned to them.

"Well, then, having suggested the mode of beginning, which is as much as can conveniently be done in a paper of this kind, let us proceed to examine the adopted arrangements of the orders of Insects inhabiting Britain.

"*Coleoptera.* In the order Coleoptera, our English authors are agreed in commencing with the Geodephaga, and in placing at the head of this tribe the family Cicindelidæ; predaceous beetles, diurnal, with strong jaws, and gifted with superior powers for flying and running. The manner in which the arrangement of this order is carried out is in tolerable accordance with our plan; the principal deviation from it being, in the position assigned to the Staphylinidæ by Stephens.

"*Lepidoptera.* The order Lepidoptera contains no truly predaceous insects; but there is no difference in opinion, in assigning the first rank to the Rhopalocera, at the head of which stand, undoubtedly in their true position, the Papiliones. The other groups follow one another in natural order from the highest to the lowest, the position of the Pyrales being perhaps the most in dispute.

"It appears, then, as if the plan here advocated was the identical plan on which is based the arrangement of the above two orders of insects. Let us, however, examine the remaining orders, and we shall see a variance, unaccountable, perhaps, unless on the supposition that attempts have been made to connect the head of one order with the tail of another; thus destroying the harmony which might otherwise subsist in the arrangement of the component parts of each, and the relative position which these parts or subdivisions might hold, compared with those in the vertebrate animals. Proceeding to the order

"*Hymenoptera.* Stephens, in his 'Catalogue,' commences with the Tenthredinidæ and ends with the Cynipidæ; Curtis in his 'Guide,' Westwood in his 'Modern Classification,' and the British Museum Catalogue, each commence with the Tenthredinidæ and end with the Apidæ; the species of this family which is placed last being the hive-bee. Surely an insect which has commanded the admiration of naturalists in all ages, for its wonderful instinct and economy, and its utility to man in furnishing him with wax and honey, should deserve a higher position than the very bottom of such an extensive order as the Hymenoptera. But we may suppose here that an attempt has been made to reduce to practice the circular system of McLeay, and that the circumference of the circle has been cut between the Apidæ and Tenthredinidæ, so as to allow it to fall into a straight line; but if this be the case, is not any entomologist at liberty, for the purpose of arranging his collection, to cut the circle at any part of the circumference that he pleases? And might not a better starting point be found with the Vespidæ or Formicidæ than with the Tenthredinidæ, which are harmless to other insects?

"*Diptera.* Mr. Walker, in the 'Insecta Britannica,' begins with the Pulicidæ and ends with the Nycteribidæ. This looks something like another attempt at the circular system. Of the family Asilidæ, he says, "These flies are all carnivorous, and are the

most powerful and generally the largest of the Diptera: they destroy Coleoptera and Hymenoptera, as well as insects of their own class.' Mr. Walker is a good authority, and if we ought to arrange this order, in conformity with the arrangement of the Coleoptera and Lepidoptera, and with that of the vertebrate animals, we now know where to begin; but it would be just as rational to place a *rat* at the head of the Mammalia, as a domestic nuisance like the *flea* at the head of the Diptera. Stephens divides this order into three: 1st, Diptera; 2nd, Homaloptera, containing the families Hippoboscidæ and Nycteribidæ; and 3rd, Aphaniptera, the single family Pulicidæ. He commences his Diptera with the Culicidæ and concludes with the Muscidæ, placing the genus Lonchopteryx at the end. Curtis and Westwood separate only the Pulicidæ into a distinct order, both, however, placing it first, and ending the Diptera with the Homaloptera of McLeay and Stephens. Comparing their arrangements of the order as restricted by Stephens, both commence with the Culicidæ the same as he does; Curtis ends with the Phoridæ, Westwood with the Œstridæ. In the arrangement of the families and of the genera in the family Muscidæ our authors widely differ.

"*Neuroptera and Trichoptera.* Here Stephens, Curtis and Westwood, agree in making two orders; but in the British Museum Catalogue these are united under the appellation Neuroptera; the insects constituting the Trichoptera of the above authors, being neither placed first nor yet last. Stephens commences the Neuroptera with the Boreidæ and Panorpidæ, and concludes with the Perlidæ. Curtis begins with the Libellulidæ, and ends with the Perlidæ. In Westwood's arrangement the Psocidæ are the first, and the Raphidiidæ the last, of the British families. In the British Museum list, the order including the Trichoptera, is begun with the Psocidæ and terminated with the Perlidæ. If we place at the head of the Neuroptera the most powerful and active of the predaceous insects belonging to it, there can be no difficulty in the selection; Curtis is the only one of our authors who places the dragon-flies in that position.

"*Orthoptera.* The British species belonging to this order are few in number. They may be divided into five families, and arranged thus: Blattidæ, Forficulidæ, Achetidæ, Gryllidæ and Locustidæ. There are two other families which are not British; the Mantidæ, which are predaceous; and the Phasmidæ, which are probably the lowest group of the order. Curtis separates the Forficulidæ and Blattidæ, each into distinct orders; then follow Achetidæ, Gryllidæ and Locustidæ. Stephens and Westwood separate the Forficulidæ only. The latter author agrees with Curtis in the arrangement of the families, whilst Stephens nearly reverses it.

"*Hemiptera.* Stephens begins with the Cimicidæ, and ends with the Notonectidæ. The latter are predaceous insects, and Curtis and Westwood place them at the head of the order: they both terminate it with the Pentatomidæ; but these do not appear to be near the lowest group.

"*Homoptera.* Stephens and Westwood place the Cicadidæ first and the Coccidæ last. Stephens introduces the Thripidæ here, which Westwood places in an order by themselves at a great distance from this. Curtis also introduces the Thripidæ, but, placing the Homoptera before the Hemiptera, he just reverses the position of the families, beginning with the lowest group and ending with the highest.

"Having now taken a cursory review of the commencement and termination of each order, in the adopted methods of arrangement, and seen the great want of some fixed plan applicable to all, let us turn our attention to the relative position

to be assigned to the orders themselves, based on the nature of the metamorphosis, progressing in each division from the highest rank to the lowest.

"On this system I shall adopt the classification proposed by Mr. Dallas, with but little other alteration than the sinking of the minor orders.

"The class Insecta, then, will be divided into three sections:—

"I. METABOLA.—Insects undergoing a metamorphosis which is termed complete; the pupa unable to take food, and being for the most part quiescent. This section comprises

Order 1. Coleoptera.
2. Hymenoptera.
3. Diptera.
4. Lepidoptera.
5. Trichoptera.

"II. HEMIMETABOLA.—Metamorphosis semicomplete; the pupa being active and able to feed. This comprises

Order 6. Neuroptera.
7. Orthoptera.
8. Hemiptera.
9. Homoptera.

"III. AMETABOLA.—Without metamorphosis, undergoing only a change of skin; comprising the apterous insects called spring-tails, lice, and bird-lice.

Section I.

"1. *Coleoptera.* Westwood says, 'This order comprises the extensive tribes of beetles, and, in respect to the size of some of these insects, or the number of individual species, must be regarded as occupying the foremost rank amongst insects.' The pupa is covered by a thin skin, through which the limbs are visible.

"2. *Hymenoptera.* In the preparatory states, and the mandibulated mouth of the perfect insects, this order has a close affinity with the Coleoptera. The larvæ of the Tenthredinidæ, however, make an approach to those of the Lepidoptera.

"3. *Diptera.* As one reason for placing the Diptera next, observe what Westwood says, in speaking of the Hymenoptera: 'It seems to be admitted on all hands that the insects, which are the real analogues of the present order, exist in the Dipterous order, almost every Hymenopterous group having its representative in the latter. Mr. McLeay has also noticed the apodal structure of the larvæ as analogous in both orders.' There are two forms of pupa among the Diptera, the extricated and the obtected; the former most resembles the pupa of the Lepidoptera; in the latter the skin of the larva is not shed, but hardens and forms, as it were, a cocoon. The pupæ of the Culicidæ and Chironomidæ are aquatic and are active; but their movements are not by means of legs, and differ totally from those of the pupæ of insects belonging to the second section.

"4. *Lepidoptera.* The position here given to this order is partly explained above.

There are no predaceous insects among them. Their larvæ differ more on the whole from those of the first and second orders than the larvæ of the Diptera do. The perfect insects are inferior in strength; in the parts of the mouth, and in the legs especially.

"5. *Trichoptera.* In this order I propose to include the following principal groups: 1. Panorpidæ; 2. Raphidiidæ; 3. Hemerobidæ; 4. Sialidæ; 5. Phryganidæ. The term Trichoptera, however, is only partially applicable. Too little is known of the transformations of these groups to rest satisfied in regard to their true position. The pupæ are said to be inactive during the greater period of their existence, but some of them acquire sufficient strength, previous to their change, to creep into a position suitable to effect it.

"In reviewing the above arrangement of the five orders in this section, and taking a general survey of each, there may be observed a gradation from a hard-bodied, strong, and well-defended insect, to a soft-bodied, weak, and defenceless one.

Section II.

"With regard to the arrangement of the orders in this section, it may perhaps be sufficient to say, that the first and second, the Neuroptera and Orthoptera, are mandibulate, and the other two suctorial. The Neuroptera comprise a wide range of insects; the Libellulidæ being highly predaceous, powerful and active, whilst the Ephemeridæ are short-lived and feeble. The order Homoptera contains several families of insects having a particularly low organisation.

"It remains now to compare the Cibarian system of classification, or that founded on the structure of the mouth, which, having been adopted by our leading English authors, has hitherto obtained general favour in this country. The great objection to this system is, that orders are thereby separated which otherwise have a close relationship. Thus, the Diptera are placed at a distance, more or less remote, from the Hymenoptera; whilst the Hemiptera and Homoptera are separated from the Orthoptera by several orders having little relation to either; the intervention of the Lepidoptera being particularly out of place in a system aiming to be a natural one. Even among the mandibulate section the Hymenoptera are removed to some distance from the Coleoptera, to which they have a closer relationship than the orders that intervene.

"I will not contend that a system of classification founded on the nature of the metamorphosis alone will be perfect; but I maintain that, compared with the Cibarian system, 'it leads,' as Mr. Dallas says, to a more philosophical result.'"

On the conclusion of the paper, the President was requested to leave the chair, when the Rev. Henry H. Higgins was called thereto, and a vote of thanks given by acclamation to the President for his valuable and interesting paper. On the resumption of the chair by the President, a vote of thanks was carried to all the gentlemen who had so handsomely contributed to the pleasure and instruction of the members and visitors present; and it was moved by Mr. McKeonce and seconded by Mr. Cooper, that a special vote of thanks be tendered to Mr. Reading, of Plymouth, for his magnificent and valuable exhibition, sent at a great risk; and to Mr. Constantine, of Blackburn, for his kindness in exhibiting his addition to the Fauna of Lancashire, &c., and for his very useful and interesting, though far too short paper, on "Specific Distinctions."

Mr. Greening observed that he had adopted the President's plan of arrangement in his recent re-arrangement of the insects in the Warrington Museum, to which institution he is Honorary Curator.—*C. S. G.*

DUBLIN UNIVERSITY ZOOLOGICAL AND BOTANICAL ASSOCIATION.

December 18, 1857.—W. H. HARVEY, M.D., F.L.S., V.P., in the chair.

Dr. M'Donnel read a very elaborate and interesting paper on "The Electric Powers of the Actiniadæ." The species which the author found to develope most electricity was the common smooth anemone (*Actinia Mesembryanthemum*) of our coasts; the galvanascope used was the lumbar nerves of the common frog, and the experiments were conducted with the greatest care. The lumbar vertebræ were carefully detached from the pelvis, which with the limbs were placed on a piece of board floating on the surface of the water, the vertebræ being allowed to hang over the edge. On these being seized by the anemone the legs of the frog were immediately convulsed.

A prolonged discussion on this important paper followed.

Mr. Edwin Birchall read some "Notes on Additions to the Irish Lepidoptera," chiefly taken by himself and Mr. A. G. More in the West of Ireland. These additions, thirty-eight in number, were supplemental to the Rev. Joseph Greene's 'Catalogue of Irish Lepidoptera, published, some three years since, in the 'Proceedings' of the Association. Mr. Birchall exhibited specimens of all the insects enumerated.

The Chairman expressed his opinion of the importance of thus working out our native Fauna, and of the utility that could not but result from having all these additions carefully recorded.

Professor Kinahan read a paper by W. Spence Bate, F.L.S., "On a new British Hippolyte." This prawn had been taken in Moray Firth by the Rev. George Gordon, and had been named by Mr. Spence Bate, H. Gordonii, after its discoverer.

The Rev. Joseph Greene exhibited a fine pair of that very rare moth Deilephila Galii, and a specimen of a hybrid between Smerinthus Populi and S. ocellatus.

The Rev. Professor Haughton exhibited a unique specimen of Euomphalus cristatus, from the University Geological Museum; also a lithograph of it, executed by Mr. Campbell.

J. R. Greene, Professor of Natural History, Queen's College, Cork, read a paper on the present state of our knowledge of the Cælenterata. The author began by alluding to the various changes which have taken place in the classification of the Radiata, and its subdivision into two distinct departments, for one of which the term Cælenterata had been proposed. He next noticed the various structural modifications which these animals present, as shown in the arrangement of the digestive system, the mode of secretion and appearances of the stinging filaments, the form and position of their locomotive organs, &c. He next gave an account of the numerous discoveries which had recently been made in their development, both by British and continental naturalists, illustrating his remarks by a series of diagrams representing some of the most remarkable phases which these forms exhibit, special allusion being made to the reproductive functions as performed in Hydra, Tubularia, Cordylophora, Clava, Eudendrium, Hydractinia, Sertularia, &c.; the production of the so-called Medusoids,

and the development of Cydippe, &c. An explanation was then entered into of the laws of development as enunciated by modern physiologists, and their application to the phenomena in question, showing the probability of the existence of relations between the different classes hitherto unsuspected. He next discussed the various opinions entertained by naturalists on these subjects, and concluded by giving an account of the methods proposed for their classification.

The discussion of this paper was postponed until the next Meeting.

William Spence Bate, F.L.S., was proposed for election as a Corresponding Member.

Destruction of Rare Birds.—I regret much to observe, in some late numbers of the 'Zoologist,' records of the destruction—wanton destruction, I cannot help calling it—of several of our rarer birds, and I desire to enter my protest against the same, and to call upon all true lovers of Nature to unite in endeavouring to put a stop to the practice. It is all very well to shoot a single individual of a species you have never seen before, or of which you may wish to preserve a specimen for yourself or a friend, but ruthlessly to destroy every individual of any of our rarer species that can be had "by hook or by crook," deserves the strong reprobation of every true field naturalist. Even supposing the birds so spared did not remain with you, might they not gladden the eyes of some brother ornithologist in another part of the kingdom (or even in a foreign land), and is it not selfish to deprive others of the pleasure of viewing these rarer specimens of Nature? Besides, might not the spared birds breed, and so increase their number? In many cases it would not be difficult to make out a bird one did not know by the aid of a telescope, and thus avoid the necessity of shooting it, and one might even observe its habits, in some measure, with that instrument.—*Archibald Jerdon; Mossburnford, Jedburgh, N.B., December* 14, 1857.

Birds at Sea.—On the voyage from Constantinople to Malta, on the 19th of April last, when half-way exactly between the latter place and the Island of Cerigo, the vessel, at daylight, was suddenly surrounded by a number of birds, whose flight was from the southward; they consisted principally of titlarks, in a very exhausted condition, as also of swallows, wheatears, goatsuckers and whinchats. Flights of turtle doves were continually passing, occasionally one or two alighting on the rigging, but apparently not in the least fatigued; high over head a flight of eagles or vultures passed, apparently as little fatigued as rooks returning home in the evening. Now these birds must have traversed at a single flight 270 miles from the African coast, with 250 miles yet before them; and I should have observed before that most of the titlarks, exhausted as they were, left the ship a few hours after their arrival, apparently in a very weak state: how they are enabled thus to perform such a passage is a mystery, for no doubt, without meeting the vessel, their voyage would have been accomplished in safety. On arriving at Malta, quantities of a small description of owl, cuckoos, bee-eaters, quails and doves appeared in the market, all of which must have performed a voyage of about 220 miles. This year again, while shooting in Algeria, in November, I was astonished at the quantity of jack snipes and woodcocks, which must all, to have reached that continent, travelled from the very northernly parts of Europe, none certainly from nearer than Denmark. The house martin, I find, leaves Algeria on the 23rd of October, only ten days earlier than with us, though the difference is about 17 degrees of latitude; but, as I have observed the swallow common at

Alexandria in January, in latitude 31°, I imagine the flight of the swallow from its summer to its winter residence must be about 33° or 2300 miles, as it is numerous in Norway up to latitude 67°. In Algeria I observed large flights of the siskin, goldfinch, brown linnet, green linnet and wagtails, all of which no doubt must have come to winter from the northward. The house sparrow seemed to be extremely common.—*R. Pigot; J.U.S. Club, Charles Street, December* 26, 1857.

The Great Gray Shrike (Lanius excubitor) *in Cambridgeshire.*—I have had the good fortune to have sent me no less than three of these rare birds: the first was shot at Haddenham in the winter of 1855-6; the second (male) near Ely, on the 21st of November, 1856; the third (male) in the same locality as the last, on the 25th of December, 1857.—*William Farren, jun.; King's Old Gateway, Cambridge, January* 8, 1858.

The Great Spotted Woodpecker (Picus major) *at Welney Wash.*—I have a splendid specimen of this bird, which was shot on the 9th of November, 1857, in a rather strange locality, *viz.* among some osiers on Welney Wash.—*Id.*

Blackbirds nesting in December.—Last week a fresh blackbird's nest, with four eggs, was found at Up Park, near here, the seat of Lady Fetherstonhaugh.—*William Henry Hawker; Horndean, Hants, January* 1, 1858.

The Alpine Accentor (Accentor alpinus) *near Lewes.*—On the 26th of December last I obtained two specimens of the Alpine accentor, which were shot on the Downs near here: one of them I have had preserved, the other unfortunately being too much injured by the shot. Mr. Yarrell, in his work on 'British Birds,' gives but three instances of this species being killed in England, but probably more may have occurred since the publication of his work, it being not an uncommon bird on the Continent.—*John Porter, jun.;* 8, *East Street, Lewes.*

Movements of Swifts and Migratory Birds.—I observed the swifts last summer later by some days than usual, having seen a good many on the 16th, 17th and 18th of August, no doubt in consequence of the fineness of the weather and the very high temperature. Mr. Orlando Whistlecraft, in his Almanack for 1858, has also mentioned that the house swallows near him, in Suffolk, at the commencement of the summer, forsook their usual habits and built in open places, like the martins; the usual chimneys were not occupied by the house swallow: it is certainly extraordinary by what instinct birds can foresee what sort of weather is to come. Mr. Whistlecraft is a great observer of the changes of the atmosphere, and has kept a journal for thirty-five years. I recommend his Almanack for 1858 to all those who are fond of studying the weather. During the last mild weather I have heard of rooks repairing their nests, as they do in the early part of the spring.—*H. W. Newman; Cheltenham, January* 8, 1858.

The Glossy Ibis and Yellowlegged Sandpiper killed in Yorkshire.—On the 18th of November, 1857, a very fine male of the glossy ibis was taken at Misson, near Bawtry, in Yorkshire, which came into the hands of Mr. Hugh Reid, the celebrated bird-stuffer, at Doncaster, and is now in my collection. The only British specimen of the yellowlegged sandpiper (*Totanus flavipes*) figured in Yarrell's 'Supplement' was taken at the same place, and was brought to Mr. Reid: this specimen is in my collection.—*W. M. E. Milner; Nunappleton, Tadcaster, December* 24, 1857.

Discovery of a living Frog in the solid Rock. — There is at present to be seen, at Messrs. Sanderson and Sons, George Street, Edinburgh, an extraordinary specimen of Natural History,—a frog which had been discovered alive in freestone rock. A few months ago, while some colliers in the employ of Mr. James Nasmyth (lessee of Dundonald Colliery, in Fife, the property of R. B. Wardlow Ramsay, Esq., of Whitehill) were engaged in taking out the pavement of the seam of coal, which was freestone, they discovered a cavity in which a frog was lying. On touching it the frog jumped about for some time, and a bucket of water being procured it was put into it, and taken to the surface. On reaching it the animal was found to be dead. It was at the depth of forty-five fathoms, or ninety yards from the surface, in a perpendicular line of strata, consisting of alternate layers of coal and freestone, with ironstone, and about four hundred yards from the out crop surface. The frog seems to have much of the same character as the present species. It is very attenuated, which cannot be wondered at considering its domicile for so many ages, its original existence being of course considered contemporaneous with the formation of the freestone rock in which it was contained.—*Caledonian Mercury.* [Ne nimium crede Mercurio.—*Ed.*]

Capture of Notidanus griseus, a Shark new to Britain, at Banff. — It is a pretty well-known fact that the people of this country endeavour to have something extra on their table on New Year's Day, a sort of dainty or rarity as it were. Now, I have something of this sort myself to-day, and with your leave, kind reader, and our esteemed friend Mr. Newman's indulgence, I will just tell you what it is; not that I wish you to tell me what you dine off to-day or any other day: I wish just to show you how I in some measure fare as regards food for the mind; and I dare say when you read my bill you will think, as I do myself, that it is not every one that can boast of such novelties. Well, then, at one corner of the table there is a pretty large basin full of fish-stomachs, some of which appear to be well stuffed with shrimps, whilst from others the fore legs of Gebia deltura, Calocaris M'Andreæ, and some species of Galathea are protruding. In another corner is a basket containing a quantity of old shells, fresh from the sea, and covered with all sorts of stuff, mostly of a marine character, and from the jerking and snapping amongst them I can easily perceive that there are hermits in some of the univalves. In the third corner lies as pretty and as splendid a Homelyn ray (*Raia miraletus*) as ever an ichthyologist set eyes on; this species is said to be rare on the east coast; the present one was taken at Macduff yesterday, and brought here about an hour ago. At the other and last corner sits just as strange and as curious a fish as there exists anywhere out of the sea, namely, myself, scribbling away here. We now come to the centre of the table, and here lies the chief dainty, or king of the feast, weighing nearly four hundred pounds, —a pretty good dish, you will be thinking, for a Lord Mayor's feast; doubtless it would lunch half-a-dozen aldermen; I am sorry to say, however, that it is neither a baron of beef, a mountain of roasted turkeys, nor a pyramid of plum-pudding, but a rather hideous and terrific-looking and somewhat rare monster from the deep, of the shark family. Now, reader, such are the viands that crowd my humble board on New Year's Day. Would you like to dine with me? I dare say not, unless you are an out-and-out naturalist, and then I have no doubt you would find many of my good

viands very palatable. But I must tell you something more about this centre dish of mine. I have said that it is a rare one; it is so, in so far that it is entirely new to this quarter, and if I am not mistaken is not to be found in Yarrell; in Gosse, however, I think you will find him, under the name of Notidanus griseus. But I will give you his dimensions as near as I can, with a few words as to his appearance; and if you are in any way versed in these matters you will then in some measure be able to judge for yourself. Well, then, first as to his head: it is in length 1 foot 2½ inches; lower jaw 11 inches; from the head to the dorsal (there is only one) 5 feet 5 inches; from the fore to the back part of the dorsal, which reaches the tail, 11 inches; height of dorsal 7 inches; tail 3½ feet; pectorals 17 inches by 12; ventrals 14 by 5; anal 9 by 5; distance of ventrals from anal 7 inches; breadth of caudal at commencement of tail 6½ inches; this, however, gradually narrows until it reaches within a few inches of the end of the tail, when it again expands to about 5 inches, and then forms a sort of lobe; for about half its length, too, the caudal is very rough and warty. Vent from the mouth 5 feet 9 inches; length from the snout, which is blunt and roundish, to the mouth 7 inches; nostrils to the mouth 4 inches; ditto to the eye 4 inches; circumference of eye 2½ inches by 1¾. The pupil of the eye is of a most beautiful and changing green colour; the iris is of a very deep iron-gray, which with its large size gives the animal a most terrific and appalling look. Spiracles six, the last one opening close to, or rather on the base of, the pectoral. Girth round the head 45 inches; before pectorals 54 inches, behind 55, middle 57; before ventrals 47 inches, behind 32; tail, where broadest, 20 inches, and in shape flat rather than round. Teeth in two rows; those of the upper jaw with three longish and very sharp points; those of the lower jaw, except the centre one, which is wedge-shaped, very much serrated, having each from nine to ten deeply jagged points. Gape from 20 to 24 inches. Colour of the upper parts of an irony or reddish gray, inclining to leadish on the belly. The skin, when stroked downwards appears, and in fact is, perfectly smooth; but reverse the action, and then it feels and becomes remarkably rough and prickly, and very painful to the hand. The ridge of the tail, which is of a flesh-colour, is very thickly set with pretty large, sharp, prickly tubercles, of an oblong form. Now as to his appearance: — At first sight you would almost, if not altogether, take him for a specimen of the fox shark (*Alopias vulpes*); but the broad, pointed tail, in having but one dorsal, and the broad, bull-like head, soon convinces you that he has nothing at all to do with foxy. He was taken on Tuesday last, on a hook baited for haddocks, and landed at a place called Whitehills, about two miles from this. He is to be preserved for the Banff Museum, for which he has been bought. — *Thomas Edward; Banff, January* 1, 1858. PS. — I have just been into the stomach of the Notidanus, where the fishermen who took him assured me that I should find at least one corpse, and perhaps two. This, however, has not been my luck, for it was perfectly empty, save that there were about thirty leech-like worms either moving about on or adhering to the bare walls. These I have secured in a bottle, and as long as the stock lasts I shall be most happy to send specimens to any one who may wish for them, reserving one or two for myself and friends here.— *T. E.; January* 2.

Two Novelties for the next Edition of the 'Insect Hunters.'—There are many very minute insects and beetles which come out only at night. These are very interesting to the entomologist, but at the same time very difficult to catch. Toads are not unfrequently turned into beetle-traps, and made to catch these little night insects. A brigade of skirmishing toads is turned loose into the garden in the evening: the toads, unconscious why so much kindness is shown to them, do their best to get a good meal; but in the morning their master comes and makes them eject all their night work, which he does without hurting them. In this way many curious and rare specimens of minute nocturnal insects have been obtained. I have heard of a capital way to catch night-moths, with little trouble: it was practised by a brave-hearted and gallant artillery officer,—alas! now no more. He lived in a charming country house near St. George's Hill, at Weybridge. The woods thereabouts are full of curious insects, and he used to catch the moths by smearing the trunk of a tree with sugar and beer boiled together. A lantern was then placed near the trap; the moths, attracted by it, came flying round, and were caught by the sticky mixture.—*Buckland's Curiosities of Natural History.*

Occurrence of Sphinx Nerii at Brighton.—I have lately had the pleasure of placing in my cabinet a magnificent specimen of Sphinx Nerii: the insect was accompanied by the following note:—"The specimen of Sphinx Nerii was taken on the 16th of August, in a room in Mount Sion Place, at the back of where I live, by a friend of mine. Being a large moth, he secured it under a half-pint tumbler, in which it had been all night when I first saw it: it appears to have flown in at a window, attracted by light. Mr. Samuel Stevens was at Brighton on the day it was brought to me, and saw the insect while it was still alive."—*Lewis Tidy;* 16, *Crown Gardens, Brighton, January* 20, 1858. This note will, I think, establish the claim of this individual specimen to a place in a British collection.—*A. F. Sheppard;* 16, *North Buildings, Finsbury, January* 22, 1858.

Trochilium Vespiforme (Linn.?), *Asiliformis* (Fab.).—Mr. Gardner (Zool. 5924) wishes to make it appear that this species is almost unknown upon the Continent. If he is ignorant of the fact, I beg to inform him that he will not find any great difficulty in procuring specimens from Paris, "set in the British style." I have seen them in M. Becker's boxes as well as in the Paris collections. The larva of this species feeds upon the poplar, and its rarity is probably more apparent than real. Mr. English once found several pupæ-cases protruding from an aspen in our woods, which, from their size, I have no doubt belonged to this species. I took three specimens in our garden, all of them near the trunk of an aspen used as a support to a tree, and which was brought from our woods, and have met with one or two others in this neighbourhood. —*Henry Doubleday; Epping, January* 14, 1858.

Proposed Generic Name for the Phlogophora meticulosa of our Collections.—It is very possible that on the Continent the genus Phlogophora, *Treitschke* and *Boisduval*, and consequently of our cabinets, is described by some other author or authors under another title; but as I am not aware of the fact, not having an opportunity of examining any works relating thereto (and until this is ascertained), I propose that the alterations in our lists should stand as follows:—

PHLOGOPHORA, *Treit., Boisd.*

lucipara, *Hübn., Linn., &c.* (Euplexia lucipara, *Steph.*).
empyrea, *Hübn., Treit.*

And that meticulosa should be raised to a new genus, under the name of Racoptera, referring to the ragged or wrinkled appearance of the insect when at rest. If any one is aware of this species, or the Continental ones allied to it, having been described otherwise than as Phlogophora, I should feel obliged by their furnishing such information through the medium of the pages of the 'Zoologist.'—*John Scott; Southfield Villas, Middlesbro'-on-Tees, January* 5, 1858.

British Geometrina, as arranged and named in M. Guenée's first Volume of the Geometræ of the whole world.—

URAPTERYX
Sambucaria
EPIONE
Vespertaria
Parallelaria, D. L.
Apiciaria
Advenaria
RUMIA
Cratægata
VENILIA
Maculata
ANGERONA
Prunaria
METROCAMPA
Margaritata
ELLOPIA
Fasciaria
EURYMENE
Dolobraria
PERICALLIA
Syringaria
SELENIA
Illunaria
Lunaria
Illustraria
ODONTOPERA
Bidentata
CROCALLIS
Elinguaria
ENNOMOS
Alniaria
Tiliaria
Fuscantaria
Erosaria
Angularia
HIMERA
Pennaria
PHIGALIA
Pilosaria
NYSSIA
Zonaria
Hispidaria
BISTON
Hirtaria
AMPHYDASIS
Prodromaria
Betularia
HEMEROPHILA
Abruptaria
CLEORA
Viduaria
Glabraria
Lichenaria
BOARMIA
Repandaria
Rhomboidaria
Abietaria
Cinctaria
Roboraria
Consortaria
TEPHROSIA
Consonaria
Crepuscularia
Extersaria
Punctulata
GNOPHOS
Obscurata
DASYDIA
Obfuscata
PSODOS
Trepidaria
MNIOPHILA
Cineraria
Corticaria, D. L.
BOLITOBIA
Fuliginaria
PSEUDOPTERNA
Cytisaria
GEOMETRA
Papilionaria
Smaragdaria
NEMORIA
Viridata
IODES
Vernaria
Lactearia
Æruginaria, D. L.
PHORODESMA
Bajularia
HEMITHEA
Thymiaria
Æstivaria, D. L.
EPHYRA
Poraria
Punctaria
Trilinearia
Omicronaria
Orbicularia
Pendularia
HYRIA
Auroraria
ASTHENA
Luteata
Candidata
Sylvata
Blomerata
EUPISTERIA
Heparata
VENUSIA
Cambricaria
Erutaria, D. L.
ACIDALIA
Ochreata
Perochraria, D. L.
Rubricata
Scutulata
Bisetata

Acidalia	Acidalia	Acidalia
Reversata, D. L.	Obsoletaria?	Commutata
Reversata	Ornata	*Nitidaria*, D. L.
Bisetata, D. L.	Promutata	Strigilata
Contiguaria	*Immutata*, D. L.	*Prataria*, D. L.
Eburnata, Stainton	Straminata	Imitaria
Rusticata	*Marginepunctata*, D. L.	Emutaria
Osseata	Subsericeata	Aversata
Holosericeata	Immutata	Inornata
Incanaria	*Cæspitaria*, D. L.	Degeneraria
Virgularia, D. L.	Remutata	Emarginata

— *Communicated by Henry Doubleday, Esq.* [The names added in *Italics* are those used in Mr. Doubleday's 'List.']

Occurrence of Eupithecia pernotata in England.—Last summer I bred a specimen of an Eupithecia which I thought must be new to this country: I sent it to my friend M. Guenée, and he informs me that it is his Eupithecia pernotata, only known as a native of Piedmont till last year, when he received a single male captured in France. I believe mine was reared from larvæ kindly sent to me by Mr. Machin, who found them upon the golden rod (*Solidago Virgaurea*); the others produced castigata.—*Henry Doubleday; Epping, February* 3, 1858.

[This is quite a large species, pale-coloured with a broad reddish border round the wings.—*Ed.*]

Two British Geometræ included under the name Phibalapteryx gemmaria: Chilo obtusellus of Stainton = Tinea paludella of Hübner.—I have for some time suspected that two distinct species of Geometræ were confounded together in this country under the name of gemmata. Through the kindness of Mr. Benjamin Standish and of Mr. Harding, of Stapleton, I am now able to state that my opinion was correct. In 'Lepidoptera Britannica,' p. 340, Mr. Haworth describes a Geometra, then in the collection of Mr. Francillon, under the name of angustata: this is the true gemmata of Hübner (Geo. fig. 283, Catalogue No. 3219). Haworth's words, "Alæ—puncto medio ordinario ocellari, iride albida, pupilla atra," leave no doubt upon the subject. Mr. B. Standish possesses a beautiful female, taken by himself in his garden at Camberwell, and last autumn another specimen, also a female, was taken near Liverpool, and sent to me for examination. Another species very closely allied has occurred more frequently: Mr. Harding kindly lent me a male, which he took near Bristol, to send to M. Guenée, and a short time afterwards Mr. Norcombe kindly presented me with a specimen, also a male. My friend M. Guenée has examined these two individuals, and informs me that this Geometra is the fluviata of Hübner (Geo. fig. 280—281 and Catalogue No. 3220), this and gemmata being the only two species of Hübner's Coitus or genus Plemyria. Although closely allied they are readily distinguished; the central black spot in the superior wing of fluviata is destitute of the white iris, and there is a short oblique line at the apex of the wing, which is wanting in gemmata. Mr. Greening has taken this species in the North of England, and several specimens have occurred in the South. On the Continent it is a Southern species, Boisduval only giving Sicily as a habitat; both species are more frequently found near the coast than inland. M. Guenée also informs me that the Chilo obtusellus of Mr. Stainton is the Tinea paludella of Hübner, Chilo paludellus of Duponchel and Crambus paludellus of Guenée's Index. I received two specimens

from M. Becker about twelve years since, but the number attached to them was omitted in the list sent, and they remained nameless in my collection of European Lepidoptera: upon its discovery at Horning Fen I wrote to M. Becker, sending the number attached to the insect, and requesting him to give the name; in reply he stated that he had declined collecting Micro-Lepidoptera, and had mislaid his Catalogue, and could not therefore furnish me with the name of this species. A short time since I forwarded a pair to M. Guenée, and he kindly gave me the name.—*Id.; January* 13, 1858.

A supposed new species of Tinea allied to T. rusticella.—Some years ago, when I was in the habit of visiting the famous district of Rannoch, I used to be astonished at capturing, far away in the woods, either at rest on the trunks of the black firs, or by beating these trees, specimens of what appeared to me at the time to be Tinea rusticella. From the middle of June until the first week in July they are not uncommon, and are very frequently to be met with on those trees, at the foot of which are the ant-hills which yield us T. ochraceella: its habit, however, seems to me to be so much at variance with the T. rusticella of our cabinets, although its resemblance to the insect above-named is very great, that, after long examination, I feel convinced they ought to be separated; and first let us set aside the difference in habit, and look at a feature impressed on the insect which at once catches the eye of all those who see the two side by side, *viz.* the much more distinct ochreous spot in the middle of the wing, and a large ochreous somewhat triangular patch at the anal angle, this latter never occurring in examples of our T. rusticella, so far as I am aware; moreover, I think the general appearance of the wing is darker in the Rannoch species, thereby giving a brighter and more decided character to the ochreous markings: in all other respects they seem to harmonize,—the ochreous head and face, pale palpi, irroration on the wings, pale ochreous cilia varied with fuscous, and pale gray posterior wings; and from these circumstances it may be thought that the distinguishing features are of too superficial a nature on which to found a species, and that these may be the result of the difference of climate; but let us now assume that climate may have a little to do in the matter. Will climate entirely alter the habits of an insect, so that that species which is common enough with us in our houses and outhouses should take itself away to the woods, far from the habitation of man, on being found a few hundred miles North or South, as the case might be? Species may vary, but the home of the insect has a similarity in all cases, and I think we have grounds on which to base a supposition that the two insects are distinct species. Many have called my attention to them with the question, "Do you think there are two species united?" and as often have I looked on them in silence, not daring to hazard a positive reply. Length of observance, however, combined with the above oft-repeated question, and the convictions of several other entomologists, lead me to describe them as such; and any one with but a limited knowledge of the Micros is able to separate them at a glance from the description I have given. In the 'Insecta Britannica,' vol. iii. p. 27, and immediately following the description of T. rusticella, Mr. Stainton alludes to this insect with a query as to whether it is a variety; but until both insects are bred from the same batch of eggs I will adhere to my present views; and now that the gentleman there named as having taken it has passed from amongst us, after a long and laborious life spent in enriching our cabinets with rarities from the North and from the South, and whose untiring efforts, year after year, when an age had grown upon him which unfits and incapacitates most men from working, "filled

our vacant places," as a slight tribute to his memory, I propose for it the name of Tinea Weaverella.—*John Scott; Southfield Villas, Middlesbro'-on-Tees, January* 5, 1858.

The Tzetze.—Mr. Bracy Clark (Zool. 5720) claims the "identification of the tzetze of Africa with Œstrus Bovis." Specimens of the last-named insect may be, as Mr. Clark states, "exceedingly scarce," and since he has been so fortunate as to obtain examples, it is to be regretted that he did not wait to compare his Œstrus with a genuine tzetze, even if he could not accomplish this at the British Museum, before publicly broaching a theory for which there is not the slightest foundation. Mr. Clark refers to Dr. Livingstone's report of the annoyance occasioned by the tzetze; but he could not, in July last, have seen the detailed account of the insect, its operations and its form, as given in Dr. Livingstone's published 'Travels,' which completely disproves Mr. Clark's imaginary "identity." In the 'Travels' the African fly is represented (magnified) on the title-page, and again at p. 571, nearly the natural size, as well as magnified, together with the proboscis and the poison-bulb at the base greatly magnified: these figures are said to have been from a drawing by Mr. J. E. Gray, of the British Museum. The description of the insect will be found at pp. 80—83, with incidental notices of it throughout the volume. Dr. Livingstone clearly shows that the real tzetze does possess "a weapon of infliction," and that of a very formidable character, it being triple, but has not "a telescopic sort of tube for thrusting the egg down upon (into?) the skin" (Zool. 5721). The African fly, moreover, does not cause a mad alarm in the cattle by its "susurrus, or whistle," as the gadfly does, while it is "the infliction," and not the noise of its approach from which the mischief it occasions proceeds: so that in every respect Mr. Bracy Clark's suppositions are contrary to the actual facts. As some of the readers of the 'Zoologist' may have no opportunity of seeing Dr. Livingstone's 'Travels,' it may interest them to learn, not only what is not the tzetze, but also what it really is. The scientific name is Glossina Morsitans; its size rather exceeds that of the common house-fly; the colour is nearly that of the hive-bee, with three or four yellow bars across the abdomen; the wings project considerably beyond the body, and it is very active, except when chilled, which soon happens. The bite is certain death to horse, cattle and dog, but the result appears to follow not with equal rapidity in all cases: it is harmless to man, wild animals, mule, ass, goat and sheep, even to calves while sucking, though dogs die when fed upon milk. The districts where the insect prevails vary, it would seem, even arbitrarily, and that they are clearly defined; for instance, it will be found on one side of a river and not on the other, at a distance of only fifty yards. Dr. Livingstone also mentions reasons for believing that the tzetze has been introduced where formerly it did not exist; but how far we are warranted in hoping for the extinction of the pest, either partially or generally, time and a closer acquaintance with the country are, I think, required to show.—*Arthur Hussey; Rottingdean, January* 6, 1858.

Note on Anisolabia maritima, Bon.—Since my notes on this subject, published in the January number (Zool. 5895), were penned, I have submitted the specimen mentioned as being the first stage of the insect to a microscopic power of 400 diameters, in the hope that I might have been able to see some traces of the future development of the additional joints which appear in the next. I was anxious to ascertain whether my inference that they were formed at the expense of the fourth joint could thereby be strengthened, or whether, as shown by my friend Mr. Murray, in his

valuable 'Remarks on the Metamorphosis and Growth of the Leaf Insect (*Phyllium scythe*),' the third joint was the source whence the great increase sprung. The result has been that no indication of any divisions can, even with that high power, be perceived; and therefore the actual observation of the act of transformation can alone, if at all, solve the question. I incline, however, to my former opinion, because in Anisolabia and all the Forficulæ the third joint retains, in all its future stages, its full length, and the small joints commence with the fourth, whilst in Phyllium the long third joint disappears in the male, in which sex only the great change occurs. It may be interesting to know that the micrometer gives ·0008th of an inch as the width of the apical joints of the antennæ at their junctions. No wonder they are so often imperfect!—*George Wailes; Newcastle-on-Tyne.*

A Systematic List of Coleoptera found in the Vicinity of Alverstoke, South Hants.

By Arthur Adams, Esq., F.L.S., Surgeon of H.M. Surveying Ship 'Actæon;' and William Balfour Baikie, M.D., F.R.G.S.

(Concluded from page 5843).

LONGICORNIA.

1. Fam. Cerambycidæ, *Kirby.*

1. Aromia, *Serv., Steph.*
   A. moschata, *Linn., Steph.* Occasional; on willows near Stokes Bay.

2. Callidium, *Fabr., Steph.*
   C. Alni, *Linn., Steph.* On old palings; rare.
   C. variabile, *Linn., Steph.* Among felled timber; rare.

3. Clytus, *Fabr.*
   C. Arietis, *Linn., Fabr.* Common; on flowers, and burrowing in old palings.

4. Gracilia, *Serv.*
   G. pygmæa, *Fabr.* G. minuta, *Steph.* On willow-sticks and in old baskets.

2. Fam. Lamiidæ, *White.*

1. Leiopus, *Serv., Steph.* Liopus, *Erich.*
   L. nebulosus, *Linn., Steph.* In dead hedges; rare.

2. Pogonocherus, *Meg., Steph.*
   P. hispidus, *Fabr., Steph.* Old hedges, by beating; rare.

3. Fam. Lepturidæ, *Leach.*

1. Strangalia, *Serv.*, *Steph.*

S. armata, *Herbst.* S. elongata, *Steph.* Very common; on flowers, especially of Apiaceæ.

S. melanura, *Linn.* On flowers; Rowner.

2. Leptura, *Linn.*, *Steph.*

L. tomentosa, *Fabr.*, *Steph.* Not uncommon; on roses in gardens, on umbelliferous flowers, and on Achillea Millefolia.

L. livida, *Fabr.* (Pachyta), *Steph.* On Apiaceæ; tolerably frequent.

3. Grammoptera, *Serv.*, *Steph.*

G. lævis, *Fabr.*, *Steph.* On apiaceous flowers, at Rowner.

G. ruficornis, *Fabr.*, *Steph.* On flowers of hawthorn; tolerably abundant.

EUPODA.

1. Criocerida, *Leach.*

1. Donacia, *Fabr.*, *Steph.*

D. dentipes, *Fabr.*, *Steph.* Common; on flowers of Sparganium ramosum, at Grange.

D. sericea, *Linn.* D. Proteus, *Steph.* Rare; along ditches at Grange.

D. nigra, *Fabr.*, *Steph.* One specimen taken off sedges, at Grange.

D. Typhæ, *Brahm*, *Steph.* Off leaves of Carices and Sparganium ramosum.

D. simplex, *Fabr.*, *Steph.* On leaves of Nymphæa alba.

2. Zeugophora, *Kunze*, *Steph.*

Z. subspinosa, *Fabr.*, *Steph.* Taken in considerable abundance during the early part of September, on white poplars, at Grange. This, in the sun, feigns death when captured.

3. Lema, *Fabr.* Crioceris, *Steph.*

L. cyanella, *Linn.*, *Steph.* By beating trees in copses.

L. melanopa, *Linn.*, *Steph.* On foliage in copses; not infrequent.

4. Crioceris, *Geoff.*, *Steph.*

A. Asparagi, *Linn.*, *Steph.* Occasionally met with.

CYCLICA.

1. Fam. Chrysomelidæ, *Leach.*

1. Lamprosoma, *Kirby*, Oomorphus, *Steph.*
   L. concolor, *Sturm., Steph.* Very rare.

2. Cryptocephalus, *Geoff., Steph.*
   C. minutus, *Fabr., Steph.* Rare; beating hedges.
   C. labiatus, *Linn., Steph.* Local and not abundant; on birches, at Grange.

3. Timarcha, *Redt., Steph.*
   T. lævigata, *Linn., Steph.* Roadsides and hedgerows; very common.
   T. coriaria, *Fabr., Steph.* Downs and warrens; common.

4. Chrysomela, *Linn., Steph.*
   C. Banksii, *Fabr., Steph.* Grassy banks; not uncommon.
   C. staphylea, *Linn., Steph.* Grassy banks; common.
   C. Gœttengensis, *Linn., Steph.* Banks; rare.
   C. hæmoptera, *Linn., Steph.* In grass on Southsea Common; scarce.
   C. sanguinolenta, *Linn.*. C. distinguenda, *Steph.* On Galium aperine; very abundant.
   C. polita, *Linn., Steph.* Grassy banks; common.

5. Lina, *Redt.* Melasoma, *Steph.*
   L. Populi, *Linn., Steph.* In some abundance on white poplars in Grange Copse.

6. Gonioctena, *Redt.* Chrysomela, *Steph.*
   G. Litura, *Fabr., Steph.* On broom-flowers; in great abundance.

7. Gastrophysa, *Chev.* Phædon, *Steph.*
   G. Polygoni, *Linn., Steph.* In fields; very plentiful.

8. Phædon, *Meg., Steph.*
   P. Betulæ, *Linn., Steph.* Sides of wet ditches near copses; most abundant.

9. Phratora, *Chevr.* Phædon, *Steph.*
   P. Vitellinæ, *Linn., Steph.* On willows; very plentiful.

10. Helodes, *Payk.*, *Steph.*

H. Phellandrii, *Linn.*, *Steph.* On Œnanthe Phellandrium in ditches at Grange; common.

2. Fam. Galerucidæ, *Steph.*

1. Adimonia, *Laich.* Galeruca, *Steph.*

A. Tanaceti, *Linn.*, *Steph.* Very local; in great abundance in some years on Grange warren; found in August and September; very scarce in 1856, abundant in 1855.

A. Capreæ, *Linn.*, *Steph.* On bushes in Grange copse.

2. Galeruca, *Fabr.*, *Steph.*

G. Cratægi, *Forst.*, *Steph.* On hawthorn flowers when in full bloom.

G. calmariensis, *Linn.*, *Steph.* On heather on Browndown.

G. Nympheæ, *Linn.*, *Steph.* Banks of ponds, and on bushes in Grange copse.

3. Agelastica, *Redt.* Adimonia, *Steph.*

A. Alni, *Linn.*, *Steph.* On alders at Grange.

A. halensis, *Linn.*, *Steph.* Grassy places; not uncommon.

4. Phyllobrotica, *Redt.* Auchenia, *Steph.*

P. quadrimaculata, *Linn.*, *Steph.* Along banks of streams, on Polygonum Persicaria; rare.

5. Calomicrus, *Steph.*

C. circumfusus, *Marsh.*, *Steph.* Abundant; on foliage of Myrica Gale.

6. Luperus, *Geoff.*, *Steph.*

L. flavipes, *Linn.*, *Steph.* Abundant on alders during June and July.

7. Altica, *Linn.* Haltica, *Steph.* (1. Sub-gen. Graptodera, *Chev.*)

A. oleracea, *Fabr.*, *Steph.* (2. Sub-gen. Podagrica, *Chev.*) Among herbage, Rowner, Grange; common.

A. ærata, *Marsh.*, *Steph.* Bushes, by sweeping.

A. tripudians, *Kirby*, *Steph.* (3. Sub-gen. Crepidodera, *Chev.*) Bushes, by sweeping.

A. transversa, *Marsh.* A. ferruginea, *Steph.* Occasional.

A. rufipes, *Linn.*, *Steph.* Herbage, by sweeping.

A. nitidula, *Fabr.*, *Steph.* Herbage, by sweeping.

A. Helxines, *Fabr.*, *Steph.* Willows and hazels, by sweeping; common.

A. Modeeri, *Linn.*, *Steph.* (4. Sub-gen. Phyllotreta, *Chev.*) Willows and hazels, by sweeping; common.

A. Nemorum, *Linn.*, *Steph.* Meadows and turnip fields; abundant.

A. antennata, *E. H.*, *Steph.* Not common.

A. nigroænea, *Marsh.* Lepidii, *E. H.*, *Steph.* (5. Sub-gen. Apthona, *Chev.*) Meadows.

A. Euphorbiæ, *Fabr.*, *Steph.* Hedges, by sweeping.

A. Pseudacori, *Payk.*, *Steph.* (6. Sub-gen. Balanomorpha, *Chev.* Mantura, *Steph.*) On Iris Pseudacorus.

A. rustica, *Linn.*, *Steph.* A. semiænea, *Steph.* Trees, by sweeping.

8. Longitarsus, *Latr.* Thyamis, *Steph.*

L. Thapsi, *Marsh.*, *Steph.* Meadows; common.

L. melanocephalus, *Gyll.* L. atricilla, confinis, atriceps, *Steph.* Meadows; common.

L. ochroleucus, *Marsh.*, *Steph.* Meadows; common.

L. lutescens, *Gyll.*, *Steph.* Meadows, by sweeping.

L. tabidus, *Fabr.*, *Steph.* Copses; rare.

L. Nasturtii, *Fabr.*, *Steph.* In grass, by sweeping.

L. luridus, *Oliv.*, *Steph.* L. castaneus, brunneus, nigricans, *Steph* Occasional.

L. thoracicus, *Kirby*, *Steph.* L. fuscicollis, dimidiatus, atricornis, *Steph.* Meadows, by sweeping.

9. Psylliodes, *Latr.* Macrocnema, *Steph.*

P. Hyoscyami, *Linn.*, *Steph.* Rare.

10. Plectroscelis, *Redt.* Chætocnema, *Steph.*

P. Sahlbergi, *Gyll.*, *Steph.* In moss; common.

P. aridella, *Payk.*, *Steph.* Hedges; occasional.

11. Dibolia, *Latr.*, *Steph.*

D. Cynoglossi, *E. H.*, *Steph.* One specimen found in moss.

12. Sphæroderma, *Steph.*

S. testacea, *Panz.*, *Steph.* Marshy places, by sweeping; abundant.

S. Cardui, *Gyll.*, *Steph.* On thistles in waste places.

3. Fam. Cassididæ, *Leach.*

1. Cassida, *Linn., Steph.*
   C. equestris, *Fabr., Steph.* C. viridis, *Linn.* On Mentha viridis; not abundant.
   C. rubiginosa, *Ill., Steph.* On thistles; rather scarce.
   C. Vibex, *Linn., Steph.* On thistles; not common.
   C. Salicorniæ, *Curt., Steph.* One specimen from furze, by beating.
   C. obsoleta, *Ill., Steph.* Grass in damp places; scarce.

4. Fam. Coccinellidæ, *Latr.*

1. Hippodamia, *Muls., Steph.*
   H. 13-punctata, *Linn., Steph.* Common.

2. Anisosticta, *Redt., Steph.*
   A. 19-punctata, *Linn., Steph.* Marshy places; rare.

3. Adonia, *Muls.* Hippodamia, *Steph.*
   A. mutabilis, *Scrib., Steph.* Very common.

4. Adalia, *Muls.*
   A. bipunctata, *Linn.* A. dispar, *Steph.* Extremely common.

5. Bulæa, *Muls.*
   B. pallida, *Muls.* Rare.

6. Coccinella, *Muls., Steph.*
   C. variabilis, *Ill., Steph.* Abundant.
   C. 11-punctata, *Linn., Steph.* Rather frequent.
   C. 7-punctata, *Linn., Steph.* Very common.

7. Anatis, *Muls.* Coccinella, *Steph.*
   A. ocellata, *Linn., Steph.* One specimen from an elm at Alverstoke.

8. Halyzia, *Muls.* Coccinella, *Steph.*
   H. 17-guttata, *Linn., Steph.* One specimen taken.

9. Thea, *Muls.* Coccinella, *Steph.*
   T. 22-punctata, *Linn., Steph.* Not common.

10. Micraspis, *Redt., Steph.*
    M. 12-punctata, *Linn., Steph.* Grassy banks; abundant.

11. Chilocorus, *Leach, Steph.*
    C. renipustulatus, *Scrib., Steph.* On blackthorn when in flower.
    C. bipustulatus, *Linn., Steph.* Furze, by beating.

12. Scymnus, *Kug., Steph.*
    S. bipustulatus, *Motsch., Steph.* Roots of grass in marshy places.

13. Rhizobius, *Steph.*
    P. litura, *Fabr., Steph.* Moss and roots of grass.

14. Coccidula, *Kug.* Cacicula, *Steph.*
    C. scutellata, *Herbst, Steph.* On rushes in marshy places.
    C. rufa, *Herbst.* C. pectoralis, *Steph.* Occasional.

5. Fam. Lathridiidæ, *Schaum.*

1. Corticaria, *Marsh., Steph.*
    C. gibbosa, *Herbst, Steph.* Under bark; not rare.
    C. transversalis, *Schüp., Steph.* Under bark; not rare.

2. Lathridius, *Ill., Steph.*
    L. lardarius, *Deg., Steph.* In *débris.*
    L. angusticollis, *Humm., Steph.* Hedges; occasional.
    L. transversus, *Oliv., Steph.* Occasional.

3. Monotoma, *Herbst, Steph.*
    M. picipes, *Payk., Steph.* Not uncommon.

Addenda.

Amara lucida, *Deg.* A. erythropa, A. infima, *Steph.* Occasional.

Bembidium biguttatum, *Fabr.* B. fuscipes, B. subfenestratum, *Steph.* Rather frequent.

Cercyon pygmæum, *Ill.* C. conspurcatum, stercorator, erythropum, ruinatum, fuscescens, *Steph.* Occasional.

Typhæa fumata, *Steph., Kirby.* Not frequent.

Wm. Balfour Baikie.

Note on the Flying of Bembidia.—Did any of my brother "insect hunters" observe how freely the Bembidia made use of their wings during the remarkably hot summer of 1857? I most particularly noticed this when in Cumberland, in June. Species that I never saw fly before would, on being disturbed, run at once to the top of a stone, open their wings and away. I lost many from another cause: not wishing to bottle any but the best I gave every individual a separate examination; many escaped by slipping from my fingers, and, taking wing as they fell (after the manner of a Philonthus), were soon out of danger. From this cause I missed a series of the rare prasinum: I had, on a very hot day, hunted some miles of the banks of the Irthing, with poor success, when I came to a large muddy bank, where punctulatum was in plenty, with what I took for tibiale amongst them, but they were so very active that every one escaped before I could make out what species it was. I bottled a few promiscuously; and when I came to set them out at night, I had the mortification to find that only three of prasinum were to be found: one of these, on trying to escape, flew into the water, and I now have him mounted, with the wings protruding. Having to return home next morning, I was unable to do more than hope to be more fortunate another time.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, January* 30, 1858.

Capture of Georyssus pygmæus in Cumberland.—I captured a fine series of Georyssus pygmæus when in Cumberland, in the beginning of June last year: they were running about on the muddy banks of the Irthing, each with its pellet of dried mud on the back. I should very much like to know how they acquire this coating: it can scarcely be the result of accident, for all had it, and it fitted so close that I had them to wash before they could be mounted. Although fitting so close it was of two pieces, and in some cases of three, being divided between the thorax and elytra in all, as well as between the head and thorax in some. It is very interesting to watch the little creature tottering about with its load, which does not appear to impede its motions at all; and it really requires sharp eyes to detect so well-concealed a creature, of which all that can be seen are the tips of the antennæ and legs.—*Id.; February* 2, 1858.

Læmophlæus Clematidis.—Perceiving (Zool. 5929) that Mr. J. S. Baly insinuates that I have claimed the discovery of this insect, I beg to state that its capture was recorded by me, at his request, on the 6th of July, 1857, at the Meeting of the Entomological Society, and that, in the published Proceedings of that Meeting, the following sentence concludes the paragraph relating to it: "This species was first taken by Mr. J. S. Baly, and subsequently by myself." In the 'Annual' List I merely cited it as having been registered during the year, and referred the reader to the 'Proceedings' for the original notice. What more Mr. Baly would exact for the insignificant share he had in the addition of this species to the British Catalogue I know not: with equal justice might it be asserted that I had set myself up as the discoverer of the whole of the eighty-four species enumerated in the List. But the true incentive to Mr. Baly's communication is probably to be found in his closing remarks. His strictures on the introductory portions of my ants'-nest article in the 'Annual,' emanating as they do from an active participator in proceedings which he does not attempt to justify, I leave to the appreciation of an unbiassed public.—*Edward W. Janson; 2, Alma Road, Upper Holloway, February* 2, 1858.

Notes on the British Species of Blaps. By T. J. Bold, Esq.

It will, without doubt, surprise many of our collectors of Coleoptera to be told that neither of our common species of Blaps is the mortisaga described by Linneus: such however is the case; and although Gyllenhal most carefully described it in 1810, yet subsequent authors have so bungled the matter that the synonyms of mortisaga, and our other two species (Chevrolatii and fatidica), are but a tissue of confusion.

Having now before me native examples of the true mortisaga, I will endeavour to point out distinctive characters for it and its congeners. The synonyms are part of those given in Mulsant's Coleop. de France, Latigènes.

1. Blaps gigas, *Linn.; Steph. Illust., Mand.* v. 23; *Mulsant, Coleop. de France, Latigènes*, 109, 1.

The bulk of this rare insect will lead to its immediate recognition. I have not seen a British specimen.

2. B. mortisaga, *Linn.; Gyll. Ins. Suec.* ii. 595, 1; *Mulsant, Coleop. de France, Latigènes*, 117.
   Tenebrio mortisagus, *Linn. Syst. Nat.* ii. 676, 15; *Faun. Suec.* 822.

Cylindrical, depressed, black: head large, finely punctured, labrum slightly emarginate, ciliated with fulvous hair: clypeus without a median line: thorax convex, finely and distantly punctured; obsoletely canaliculate; subquadrate, strongly margined, dilated and rounded anteriorly; narrowed behind; hinder angles acute, and having an oblique impressed fovea on each side behind: elytra depressed, finely but distantly punctured; very little broader at the base than the thorax; sides scarcely dilated, greatest width before the middle, attenuated behind, apical processes much developed. Length 9—11 lin.

Male.—Opaque; thorax much dilated anteriorly; elytra narrow, acuminated behind, with the apical processes elongate; a tuft of reddish hair between the first and second segments of the abdomen beneath: the legs somewhat longer in proportion than in the female, and with the hinder tibiæ slightly bent.

Female.—More glossy and less opaque than the male.

The cylindrical depressed form, dilated thorax and attenuated elytra will separate this species, at the first glance, from the two following.

Mortisaga appears to be exclusively a northern species: my specimens, two males and two females, were taken near Elgin, in Morayshire.

3. B. Chevrolatii, *Solier; Mulsant, Coleop. de France, Latigènes*, 119, 3.
   Blaps mortisaga, *Marsh. Ent. Brit.* i. 479, 1; *Steph. Illust. Mand.* v. 23, 2; *Id. Manual*, 326, 2558; *Westw. Mod. Class. Ins.* i. 319. fig. 39, 7.
   Blaps obtusa, *Sturm, Deutsch. Faun.* ii. 206, 4, pl. 44.

This species, the B. mortisaga of British collections, may easily be known by its small subquadrate depressed thorax, which has the disk more or less uneven, and which gives it a foveolated appearance in most specimens: the elytra are greatly dilated, widest at about two-thirds their length;* convex above, almost gibbous behind, and with the apical processes very short: when viewed in certain lights the elytra appear slightly ribbed.

Male.—More elongate, thorax proportionately wider, elytra not so gibbous, and legs longer than in the female.

Mulsant appears to be of opinion that these narrow individuals are females; but I think that the dilation of the thorax, narrowing of the elytra and elongation of the legs are indicative of the male sex in this genus.

Common everywhere. I found it very abundant in September, 1857, at Tain, Ross-shire.

4. B. fatidica, *Sturm, Deutsch. Faun.* ii. 205, pl. 45; *Spry & Shuck.* 48, pl. 57, fig. 1; *Mulsant, Coleop. de France, Latigènes*, 121, 4.
   Blaps obtusa, *Curtis, Brit. Ent.* pl. 148; *Steph. Illust. Mand.* v. 23, 2; *Id. Manual*, 326, 2559; *Samouel's Ent. Cal.* 20, 1.

The very broad thick form and short legs of this insect will at once lead to its identification. Mulsant remarks that it is a more southern species than Chevrolatii, being found in the middle and South of France. Stephens and Curtis represent it as not uncommon in the

* Mr. Westwood's figure, cited above, is a very correct outline of the female of this species.

southern portions of England. It has not yet been detected in our district.

THOMAS JOHN BOLD.

Angas' Court, Bigg Market, Newcastle-on-Tyne,
January 23, 1858.

Are there two Species of Priapulus allied to caudatus?—Will any of the numerous readers of the 'Zoologist' inform me, through its pages, if there are more than one species of the tailed Priapulus found in the British seas? There is only one figured and described in Forbes, I think. Is there any other published description? My reason for asking is simply this,—that it strikes me very forcibly that if we have not three distinct species here, we have at least two. But I may be wrong, as all the specimens I have seen have been from the stomachs of fishes, so that the difference may only be accidental, and not real as is supposed. Any information on the subject will greatly oblige.—*Thomas Edward; Banff, February* 8, 1858.

Serpula contortuplicata.—For some weeks past I have observed a curious malformation (?) in one of these very interesting worms in my aquarium. I have in a former number of the 'Zoologist' noticed the fact of the total loss of the trumpet-shaped operculum, which in several instances has fallen off, apparently without any reason, and to all appearance in a healthy condition. In the present case there is a redundancy, as the specimen I now allude to has double opercula, both perfectly developed and joined together near the base. I should mention that these opercula are each of them decidedly smaller than the single one formerly occupying their place. May I ask whether this has been noticed before, or whether it is a common occurrence?—*C. R. Lighton; Ellastone, Ashbourne.*

Occurrence of the Peregrine Falcon in Kent.—A male specimen of this bird was shot on the 9th of December, 1856, in the parish of Halling, near Rochester, and is now in my possession.—*C. W. Shepherd; Trottersclife, Kent.*

Occurrence of the Buzzard at West Harling.—A fine female of the common buzzard was shot here and sent to me on the 1st of the present month; it was in high condition; the body was covered with fat, as well as being very fat internally. It is a bird seldom met with in this district. I believe the roughlegged buzzard is not considered so scarce, as a winter seldom passes but one or two are seen or obtained.—*Thomas Dix; West Harling, Norfolk, February* 10, 1858.

Occurrence of the Roller in Flintshire.—I am glad to be able to record in the 'Zoologist' the occurrence of this rare visitor to Britain. The specimen, which appears to be a young bird, was killed by Captain E. H. Mostyn, of Saethelwyld, about a mile from the town of Holywell, whilst sitting on some railings in front of his house. Two specimens of the great snipe (*Scolopax major*) were killed this winter by a gentleman in a field near Chester, on different days.—*T. Mather; Holywell, Flintshire, January* 22, 1858.

Winter Food of the Ring Dove and Stock Dove.—"During autumn and winter ring doves feed on acorns, beech-nuts, berries and turnip leaves."—Yarrell, ii. 252. "The food of the stock dove is very similar to that of the ring dove, viz. young green leaves, peas, grain, seeds, berries, turnip leaves, beech-nuts, acorns, &c., according to the season of the year."—Yarrell, ii. 256. I have, on more than one occasion during the present month, shot several wild pigeons, including both species named in the above extracts; and, once or twice, birds of both species have fallen to the same shot. On going to pick them up, a very conspicuous dissimilarity as to their diet, during the day just closing as they fell, claimed my attention. The ring doves, without an exception, were crammed with holly berries,—so much so that, either from the shock of the fall or their dying struggles, the holly berries were disgorged in such quantities as to surprise me greatly. One bird shot dead on the wing, and falling some distance, and with proportionate impulse, must have ejected fully half a pint. The spot of ground it fell on, as seen from a little distance, was coloured red with them. One of the stock doves, however, while struggling in my hand, ejected some much smaller and less conspicuous substances, and I was led to look more closely and ascertain what its food had been: it seemed to have consisted exclusively of the seeds of the charlock,—here called 'runch,' and 'ketlock' in the neighbourhood of York,—with which troublesome weed more farms than one, not far from the plantation in which I shot the birds in question, are sadly infested. Nor in any one case have I found the stock dove had partaken of the holly berries which at present seem to form the staple food of large flocks of the ring dove. There is an ample supply in this neighbourhood: the trees—for they are really trees, with trunks from one foot to two or two and a half feet in diameter—are, in one or two places, very numerous, and even still, notwithstanding the long-continued feasting of flocks of wild pigeons and fieldfares, and great numbers of redwings, thrushes and blackbirds, are in many cases quite red with their crop of coral fruit. So much are the ring doves' crops distended by the quantity of holly berries they have eaten, that, as they fly over or past, I have been forcibly reminded, by the protuberance of their breast, of the peculiar shape which gives its name to the pouter pigeon. One I shot a day or two since, burst its crop in falling, and there was, for the instant, a scarlet shower flashing all round it as the berries rebounded from the earth and fell back again. I observe that the stock dove usually comes in to roost before the ring dove. When shot together, it was usually after they had been disturbed by previous shots.—*J. C. Atkinson; Danby, Grosmont, York, January* 25, 1858.

Contributions towards a Biography of the Partridge.

By the Rev. J. C. Atkinson, M.A.

"Of a bird so universally known" as the partridge, "little that is new can be said; with its appearance and its habits almost all are familiar."—Yarrell, ii. 334. This statement is so generally true that, even if the disposition existed, there would be but little opportunity for disputing it. Still, from time to time, I have observed some slight peculiarities in the habits of the partridge which I have not seen

noticed in any biography of that bird; and besides, I have also seen some statements and theories advanced in connexion with some of its habits, or supposed powers, which I thought were inconsistent with facts I had noticed, and have often been able to verify. Moreover, from the locality of my more recent and somewhat persevering observations, I have been almost induced to think that an account of those observations might not be so altogether every-day as to be unacceptable to the editor and readers of the 'Zoologist.' On these grounds, then, I rest my apology for the present paper.

The district I am now living in is one of deep narrow valleys,—in the main fertile and well cultivated,—between ridges of moorland reaching an altitude of 900 to 1400 feet above the sea. The cultivated part of my own immediate portion of this district may be not unaptly figured by supposing a star-fish of five arms, not very regular in shape or size, and two of them drawn together for one-third of their length towards their points, and leaving an oval space between them towards their base. The whole area of this star-fish and its arms may be some 7000 or 8000 acres, lying in the midst of twice that amount of moorland. While, then, the productive corn land in the valleys—much of it being of that quality which I have heard described as "good partridge land," that is, very friable and dry—is highly favorable to the breed of partridges, the close vicinity of the high ground, with its thick coverts of ling and bracken, adds yet further to its recommendations as a breeding and dwelling place for these birds.

The partridge pairs very early. Notwithstanding the intensely bitter cold and frost of the early part of this month, I have already (Feb. 2) observed several instances in which the courtship was evidently over, and the union effected.* Nor have I ever observed, when once the pairing has taken place, that the individuals so paired ever so far, apparently, annul the bond as to return to the life-in-common of the covey; a circumstance which may repeatedly be noticed with both the grouse and the golden plover, under the influence of severe weather.

The nest appears to be almost invariably formed on the enclosed land; I mean as distinguished from the moor or common. This year I heard of one well-authenticated instance of the nest being on the moor, but still at no great distance from the enclosures; and I believe such instances to be rare: indeed it would not be very convenient to

* Our gamekeeper yesterday, February 4, told me he had noticed the same circumstance.

the old birds to have to convey their young just-hatched brood any great distance to their food, especially over or through such obstacles as are presented by the moor. But no long space elapses before the infant covey is conducted, at least occasionally, and principally during the height of the day, to the little-disturbed quiet and shelter of some bracken-bed on "the banks"* in the vicinity of their birth-place. This year, in July, I saw a covey, the young birds not so large as thrushes, in a spot at least half a mile from the nearest corn-field. Still, as a rule, while the corn remains standing, and the potato-fields furnish the strong covert they do before the first sharpish frost, the coveys do not habitually resort to the moor. When disturbed they will, even before September is out, quit the shelter of the potatoes and rape, and go to the banks,—often rising very wild to do so,—and thence on to the open moor if again disturbed. Later on, when the potatoes are gathered and only the turnips are left, the preference for the moor is so strong that turnip-fields, which in a level country would have held two or three of the coveys bred in the adjacent corn or hay-fields, may be beaten day after day without holding a bird, except under the condition that they have been by some means driven in.† Later yet, or from the end of October throughout the winter, if the weather continues open and mild, some coveys seem to take almost entirely to the moor, and wander to a great distance in all directions. Their droppings may be observed on the smooth short sward, on the sides of the moor roads and paths, and wherever such sward is found, to a

* Bank or Banks is a word locally applied to the steep side of a hill, and even to the road up the said side. In the instance in which I apply it, it is the space which intervenes between the line of enclosures and the general or lower level of the moors, giving a surface with much the same "gradient" as a very sharp roof, and of fully 200 feet in absolute altitude. This space is clothed with coarse herbage, "breckons," and, here and there, where a spring makes a boggy place, with beds of rushes and sedges, here called "sceaves" or "clock-sceaves." Where these banks on either side one of the valleys or "dales" begin to approach each other at its termination, they break up into separate eminences or hills, of varying height and dimensions. These are called "the hills," as the termination of the dale is called its head. On many of these banks and hills the juniper grows, and sometimes to an enormous size. One of these bushes, now growing in Danby Head, is hollow in the centre from age, but is nearly 20 feet in diameter and 7 or 8 feet high.

† On September 9th I bagged nine brace in about four hours' shooting: at least six brace were shot on the banks. On October 9th I bagged 6½ brace in about two hours: every bird was shot on the moor; in fact I only had two shots on the land, and in that case the birds had been driven from the moor into the turnips, where I found them.

mile and more from their home. If the sportsman finds them now it is "more by luck than by wit."

In three different directions I knew, last season, of the existence of large packs, rather than coveys, of partridges, numbering not less than from twenty to twenty-five brace in each case. From circumstances I had only been able to visit their several haunts once or twice before the middle of October. One of these packs I have never been able to find since; another I never saw again till last Monday (February 1), when the severe weather had driven it down upon the land; and the third I found accidentally one day, and it led me nearly a mile on to the open moor in pursuit. If, however, snow falls to any extent they forsake the moor, and, however hard pressed by the shooter, manifest very little inclination to resort thither for safety.

From time to time one hears of very large coveys: during the past season I have heard of and seen more than one such. One, numbering forty birds, was named to me before the season commenced: a few shots were fired at it on September 7th, which reduced its number to thirty-seven. At this number it stood for some weeks, when, on one or two occasions, it was somewhat reduced: however, as lately as February 2nd, it still mustered twenty-eight members. I have seen two or three others of from twenty to twenty-five. I believe in the latter cases all were the progeny of one pair of old birds, and included them of course; in the former, and all similar ones, that two hens laid in the same nest (See Yarrell, ii. 335). That this does take place, from time to time, I am in a position to prove, from a circumstance communicated to me last autumn. A partridge's nest was found in a field, in Fingringhoe, in Essex, containing a great number of eggs; but one moiety consisted of the eggs of the redlegged partridge, the rest of those of the common English bird.

In general, after the great tameness which characterizes the partridge early in the season is worn off, it is much more easy to approach single birds, or groups of two or three, than larger numbers; but their habits, in respect of what the sportsman terms their "wildness," are very variable and very unaccountable. I have known fourteen out of seventeen composing a covey killed in detail, the other three being left unmolested; and I have seen bird after bird get up, when once the gun had been fired or the whirr of one or more of their fellows' wings been heard, without allowing the sportsman another shot. Sometimes I have seen two or three rise very wild once or twice in succession, and the third time, with no better cover or concealment than before, lie till the shooter almost walked upon them. One day the covey will

lie till you are in the midst of them; the next, rise from the same covert as soon as you are seen entering the field. No doubt there is a reason for this variability, but I cannot suggest one that is at all satisfactory to myself.

They seem to resort to their feeding-ground at daybreak, and they remain there until about 9 to 10 o'clock. They then, with some calling, betake themselves to the turnip-field, or the bank, or some pasture, especially if it have a dry sunny bank in it, or possibly to a bed of rushes, if there be one in any field near. Here they remain till about 3 o'clock in the afternoon, when they begin to move, often on foot, and calling a good deal. Sometimes their journey on foot is so far continued that they have but a short flight to make to their feeding-ground,—little more, possibly, than over a fence, and a few yards into the field selected. They seem to be very playful when on the move, either to or from their food, and with no suspicion of possible danger: little sparrings and rivalries as to which shall be foremost in the walk may be observed by the well-placed spectator, and all accompanied with a low continued sort of clucking, which cannot be heard very far by human ears. I have very commonly observed the use of this species of call by a wounded bird. Occasionally the louder well-known call is used; but this clucking is very common. Twice in the past season I winged a bird with each barrel: in both cases the birds, though falling far apart, had drawn together; and in one of the cases, the birds having fallen 50 or 60 yards apart, I heard this calling quite distinctly, and eventually, after charging, found both close together. I have also occasionally seen them, quite contrary to their usual habits when driven to covert, manifest great restlessness, first one and then another, and then perhaps two or three rising, quite undisturbed by any near approach of dog or man, taking very short flights and then dropping again. Once I noticed this when some fifteen brace of birds were scattered on the bank, and the whole space seemed alive with them, from their restless and incessant motions, accompanied as it all was by continual callings. I have seen, but rarely, a single bird, from among what was proved in a few moments to be a considerable covey, rise above the covert, and drop again as suddenly as it rose, and in the same place. It is no unusual thing for a bird, or more, leaving the bulk of the covey, to rise and go quite away. When this occurs, it may often be accounted for on the ground of the absence of that particular bird on whose movements and signals the covey depends for the regulation of its general conduct. In the former case, whenever I have remarked it, the covey had not been

previously flushed; in the latter, as far as my memory serves me, it was most generally after a previous disturbance and flight of the covey, and very probably after the death, at the previous rise, of the old bird or birds. They usually rise first (giving a signal just as they rise), and, from the fact of being first on the wing, are most frequently first fired at: indeed in sporting books young shooters are told that if they can succeed in killing the old bird or birds at first, they will find it much easier to get shots at the remainder of the covey; and I have no doubt that this well-founded piece of advice owes its reason to the circumstance that the covey, having lost its director, whom I believe originally to be the hen bird, is thenceforward, during that day at least, without government or organization or concert; the young birds, inexperienced and terrified, have no resource in themselves, and waiting, after a purposeless run of a few yards, for the accustomed signal for flight, lie till they are trodden on or perhaps caught by the dog or its master's hand. In fact, I believe that the whole movements of the covey are directed mainly by voice. I have heard the low clucking of the parent bird, as she was moving about with her chicks in the standing corn, continued, with short intermissions, as long as I remained within hearing; I have heard the louder clucking, above noticed, when they are on the move to or from their feeding-ground, or when wounded; I have heard a low purring sound when I have come upon a covey at bask, or at rest during the midday hours, and before they had taken alarm from my presence; and all this quite independently of the various calls which the most inattentive observer is acquainted with. In few words, they could not act with such concert as they do without very intelligible signals and a recognised authority to give them; and it is quite worth notice that the covey out of which you kill both old birds, and some of the scattered, disorganized young members, to day, will be in the course of another day or two reorganized and reofficered,—will rise before your dog as one bird,—and behave just as if it were still under the guidance of the director or directors originally given by Nature.

To pass to another subject. A few months since there was a good deal of ink shed, in a certain sporting Weekly, on the supposed power of retention of scent alleged to be possessed by some game birds, and especially by a partridge assumed and maintained by some to be almost more than a variety of the common partridge. The arguments in favour of both assumptions seemed to me most lame and inconclusive. The supposed variety of partridge, described as exclusively frequenting or inhabiting the moors (if I remember right, particularly

in some parts of Ireland), was said to be distinguished partly by this circumstance, and partly by its less size and darker plumage as compared with the common bird. Here, I am certain, with every opportunity and inducement of locality, of all the hundreds of partridges which frequent the moor at times, not one in a hundred is bred on the moor, and not one at all inhabits the moor to the exclusion of the lowlands. Hatched and nurtured in the corn-fields, though they may, in the case of a covey or two here and there, take to the moor for days, or possibly weeks together in such a mild season as the past has been, yet in snow and frost they return to the fields, and when paired are to be met with, as the rule, in the fields and not on the moor. Then as to size and plumage: he must be a most unobservant person who does not note the differences in size and shade perceptible between individuals of almost every species of birds, according to sex, age and other circumstances. In the grouse, for instance, they are most conspicuous; and one day last week I shot two snipes in succession from the same wet place: one was a fine bird, above the average in weight; the other so small I could scarcely believe it was not a jack as I stooped to pick it up. Again, I noticed one partridge in a particular covey, on two several days, so perceptibly darker than the rest that but for flight, &c., I might have been pardoned for taking it, for a moment or two, for a grouse. But to return to size: I met a farmer one day late in the season; he said to me, "I told you there was a covey of thirteen very small birds, scarcely able to fly, when you were over my farm in September; I have seen them often since, in such and such fields." A week or two after—I believe about the 19th of December—I was over his fields again, and killed a bird out of a good covey. On picking it up I was struck by its lightness and smallness; it was, however, very plump and in full plumage. I followed the covey, and succeeded in bagging three more from it, one of which was an old bird. All of the three young ones were alike in size and weight, and certainly less than the old one by one-third. On a subsequent occasion I shot most of the others; and the rule held throughout. Most of these small birds, moreover, appeared darker in colour than the usual run of partridges. But the difference in size certainly could be accounted for in only one way, viz., the very late period at which they had been hatched; and I have observed the same result of late hatching on a former occasion, nor is it difficult to be accounted for.

As to the alleged suppression or retention of scent, I think the

supposed power as much a myth as the supposed variety * of partridge. No observant person can have had much to do with the pursuit of our English game without having, again and again, found himself called on to notice the strangest circumstances connected with scent: it varies inconceivably in the same field, on the same day, nay in the same hour. Sometimes in the case of a wounded bird the scent is so strong that, instead of drawing steadily on, the dog points perpetually, as if the bird were just ahead of him; at other times he can scarcely carry it on at all, losing it again and again, only recovering it after repeated casts, and very likely losing it entirely in the end. A few weeks since I winged a bird on the moor; the ling was not high: my dog took up the scent, which seemed very strong, immediately; he "footed" the bird for 150 or 200 yards, step by step, turn by turn; and then all at once the trail was lost. Though one of the most persevering dogs I ever saw in pursuit of a wounded bird, and with a most excellent nose, he was quite unable to take up the scent again, though working every yard of ground for a large space round: the fact was, as I thought, that having worked the scent very slowly, pointing repeatedly, as if believing the bird to be in the next bunch of ling, the partridge had gained time, and, on getting out of the ling on to a bare place,—left bare by a recent fire,—on which, from its dryness and absence of vegetation, the scent would scarcely lie at all, even at first, and had entirely escaped before the dog came up, had then gone off with unimpeded speed, and by the time he came up literally "left no trace behind." And yet this might have served a retentionist with a good "case in point." Again, I have seen dogs in many cases run over a dead bird, sometimes almost or quite touching it, and give no token of noticing the scent. I have hunted a dog for ten minutes or more over a spot of a few square yards, on which I knew a dead bird lay, and have given it up as lost. The next shot I fire brings down a winged bird, which runs through a thick bed of broom, breast high; thence through a hole in a dry stone wall, into a plantation of young larches, with a very dense undergrowth of grass and weeds; and at last into the entrance of a drain: the dog hunts it unfalteringly, and I bag it in due time. I return over the ground on which I had seen

* Other circumstances connected with the assumed variety of partridges, even more mythical than those noticed in the text, I pass over as scarcely worthy serious comment; such, for instance, as that there is no increase, or the contrary, in their numbers from year to year,—where there is a covey this year there is one next, and no more; that almost all the birds in any covey are males; and so on.

the bird, looked upon as lost, fall, and while speaking to a farmer find myself almost treading on it, my dog being just as far from smelling it now as before. Yet no one can contend that the dead bird suppresses its scent. The fact was this bird had fallen into a hollow, so that, had I not been occupied with the second barrel, I could not have actually seen it to the ground; and in that hollow there were probably certain forces — analogous to those producing eddies in water, and whirlwinds, small or great, in the air—acting on the currents in the atmosphere, which conveyed the scent upwards, instead of horizontally or nearly so; while the bird, having fallen dead, had left no scent on the earth, except just the few inches it covered as it lay.

But the great objection to the theory of suppression, in my mind, is derived from another description of facts. Partridges, to speak of them only, are affirmed to be possessed of a power which, when exercised, baffles the sportsman's best dogs and his attendant's most accurate marking; but nineteen partridges out of twenty, take the season through, most unquestionably do not avail themselves of it. No doubt every sportsman is often aware he may have left a bird behind him, but how many has he found for one he believes he has left? The succession of points got in September, in a piece of good turnips or potatoes in a well-stocked country, or later still in the coverts afforded by our banks, in a good partridge year, when the young inexperienced partridges are most terrified,—in other words, in circumstances calling for, and, by the theorists, supposed to originate the exercise of the power of suppression,—is a sufficient reply to any one who has no theory to maintain. Surely if a pursued and alarmed bird could suppress its scent, it would be done by nineteen pursued and alarmed birds out of twenty, instead of by the solitary unit in twenty. Every one who has ever noticed the singular freaks with which colour spreads itself in water, darkening this place, leaving that quite untinged, can easily imagine how there must be analogous freaks, more strange still, in a fluid so much more subtle than water, and with a commingling matter so infinitely less tangible and appreciable than colouring matter. On the whole I must say that it does appear to me a most hasty generalization, from very inadequate facts, to assume that a partridge, or other game bird, can suppress its scent, because in a few isolated instances—*very* few, comparatively—a marked bird cannot be found by the pointer or trod up by the sportsman.

J. C. Atkinson.

February 5, 1858.

Breeding of the Bustard (Otis tarda) *near Leipzic.*

By Henry Smurthwaite, Esq.

I had hoped, during the course of last summer, to obtain many particulars concerning the habits of the great bustard during the breeding season,—a want which, from various reasons, has up to this time remained quite unsupplied: residing as I do in the very heart of the locality chosen by these interesting birds as their nursery, I imagined that I should have had an opportunity of studying their nidification, which has not often been afforded to a naturalist; various circumstances, however, prevented me from investigating in person, and for the somewhat meagre particulars which I send I am indebted to the kindness of a friend, who, during the breeding season of 1857, himself several times discovered the nest, or rather the eggs, of Otis tarda.

"Der Trappe," as our German friends call it, seems to have fixed upon the immense level plains between Leipzic and Halle as their favourite resort: they are found, however, in the greatest numbers in the neighbourhood of the latter town. The females, who appear to arrive on the breeding ground considerably later than the males, are deserted by the latter soon after the act of impregnation has taken place; for the great bustard brings with him into Europe the custom of the land he most loves, and indulges in a plurality of wives. The eggs are usually laid about the end of May or beginning of June, but, as the following list shows, there is every reason to suppose that two broods are sometimes hatched in the year, or that in some seasons nidification takes place much earlier and later than in others.

I had employed various persons to procure eggs for me, having made the necessary arrangements so early as February, 1857, and received specimens as follows, the date, be it understood, indicating in every instance, the day on which the eggs were taken.

April 28. Two specimens, freshly laid.

May 20. Two specimens, freshly laid.

May 29. Three specimens from two nests, the single egg being addled, the others quite fresh.

June 3. One specimen. The nest from which it was taken contained three eggs, all fresh.

June 23. One specimen, quite fresh. This egg was taken within two miles of Leipzic.

July 1. One specimen, quite fresh.

August 12. One specimen, also quite newly laid.

Those brought me on the 28th of April are smaller than any of the rest, with the exception of that which was addled. The eggs in my possession differ very considerably both in the ground-colour and in the number and shade of the secondary markings, the spots on the two brought to me in April being much deeper in hue and more clearly developed than in any other specimens which I have examined. The finding of the eggs was in most instances, as it were, accidental, for the parties in search of them were compelled to limit their efforts to walking over the ground which they knew by experience was likely to reward them, and keeping a sharp look out for the *eggs*, for in scarcely any instance is a nest formed, and this at most consists of a little straw, or occasionally a few feathers, carelessly laid together in a slight depression of the earth. On several occasions, however, the object was gained by previously taking a careful survey, with a good telescope, of the ground about to be tried: by this means, more than once, the head and neck of the hen bird were observed as she sat on her eggs; and although, long before the party could arrive at the spot thus discovered, the bird took the alarm and escaped, yet the plan was found much better than could have been expected.

The great bustard is, in the district I have above mentioned, by no means a scarce bird, although, from the few opportunities which occur of getting a view of it, it is considered to be rarer than is really the case. Had I been able last year to have aided in person in the search, I have no doubt that the number of eggs obtained might have been more than doubled: I heard of numerous specimens being taken by persons who, like myself, are enthusiastic egg-collectors.

The number of eggs laid is either one, two or three; the second number most usually, and one more frequently than three.

The young are enabled to run with speed soon after their exclusion from the egg, and it is at this time that persons desirous of obtaining the birds for their aviaries or poultry yards endeavour to secure them. If taken whilst chicks their domestication is a matter of very little difficulty: they feed greedily on chopped meat, and become so tame as to answer their owner's call and feed readily from his hand,—the more singular from the fact of their being in the wild state the shyest of all birds: the attempt to hatch and rear them from the egg is at best a troublesome and disappointing undertaking, as scarcely one in twelve is successfully brought up.

A word, before I conclude, on the much vexed question of the gular pouch. In compliance with the wishes of an English gentleman who felt great interest in the subject, I made many inquiries amongst persons likely to be well informed, two of them in fact professional taxidermists, and the almost universal opinion was that the pouch invariably exists in the adult male bustard, but never in the female of any age: the matter, I think, can only be finally decided when some good anatomist examines an extensive series of old males; and as these are at all times difficult to procure, the question must, I fear, remain unsolved.

HENRY SMURTHWAITE.

Leipzic, Rossplatz,
February 8, 1858.

Occurrence of Tengmalm's Owl (Strix Tengmalmi) *in Sussex.*—On the 27th of March, 1857, a labouring man, of the name of Day, saw a bird fly into a rabbits' burrow, in Holmbush Park, near Horsham. He dug the bird out and sold it, alive, to a bird-stuffer, of the name of Weller, in Roughy Street. This bird was afterwards shown to me, and it proved to be Strix Tengmalmi. The sex was unfortunately not ascertained. It is now in my possession.—*W. Borrer, jun.; Cowfold, Sussex, February* 15, 1858.

Occurrence of the Barheaded Goose (Anser Indica) *near Chester.*—I have been informed, by Capt. E. H. Mostyn, that a specimen of the barheaded goose, a native of India, was shot in the spring of 1848, during a hard frost, whilst in company with a flock of bernicle geese, by — Congreve, Esq., of Berton Hall, Cheshire, on the shore of the Dee, about eight miles below Chester. The specimen is still in his possession: it had probably escaped from some aviary. The following is a description of the bird. Length about 27 or 28 inches: bill yellow, with a reddish tinge at the base; head, upper part of neck and a stroke down each side of the neck white; a bar of black at the back of the head reaching to each eye; below this a second bar of black, not extending so far; rest of the neck dark gray; the feathers of the belly above the legs and thighs brown; the whole of the rest of the plumage French gray, darkest on the wings, the primary feathers of which are dark gray or black; tail tipped with white; legs orange-red.—*T. Mather; Glyn Abbot, Holywell, Flintshire, February* 9, 1858.

Black Swans nesting at Carshalton.—My black swans hatched off a brood of eight young ones on Friday last, all strong and healthy. This is the fifth time they have bred at this season of the year. Their nest was entirely exposed to the weather, and the most intense cold does not affect them.—*S. Gurney; Carshalton, February* 1, 1858.

Occurrence of the Fulmar Petrel (Procellaria glacialis) *at Brighton.*—On the 30th of January, 1858, a specimen of Procellaria glacialis was picked up, dead, on the beach, at Black Rock, Brighton. It was quite fresh, and appeared to have been

recently shot, having fresh blood about the neck. The windpipe was divided into a double tube for about half its length upward from the divarication of the bronchial tubes. I do not know whether this is the case in all the petrels.—*W. Borrer, jun.; Cowfold, Sussex, February* 15, 1858.

Another Peep at the Sea-Serpent.—I beg to enclose you a copy of an extract from the meteorological journal kept by me on board the ship 'Castilian,' on a voyage from Bombay to Liverpool. I have sent the original to the board of Trade, for whom the observations have been made during my last voyage. I am glad to confirm a statement made by the Commander of Her Majesty's ship 'Dædalus,' some years ago, as to the existence of such an animal as that described by him.—*G. H. Harrington; 14 and 14½, South Castle Street, Liverpool, February* 2, 1858.

"*Copy of an Extract from the Board of Trade Meteorological Journal, kept by Capt. Harrington, of the ship 'Castilian,' from Bombay for Liverpool.*

"Ship Castilian, Dec. 12, 1857, north-east end of St. Helena, bearing north-west, distance 10 miles.

"At 6 30 p. m., strong breezes and cloudy, ship sailing about 12 miles per hour. While myself and officers were standing on the lee side of the poop, looking towards the island, we were startled by the sight of a huge marine animal which reared its head out of the water within 20 yards of the ship, when it suddenly disappeared for about half a minute and then made its appearance in the same manner again, showing us distinctly its neck and head about 10 or 12 feet out of the water. Its head was shaped like a long nun buoy, and I suppose the diameter to have been seven or eight feet in the largest part, with a kind of scroll, or tuft of loose skin, encircling it about two feet from the top; the water was discoloured for several hundred feet from its head, so much so that on its first appearance my impression was that the ship was in broken water, produced, as I supposed, by some volcanic agency since the last time I passed the island, but the second appearance completely dispelled those fears, and assured us that it was a monster of extraordinary length, which appeared to be moving slowly towards the land. The ship was going too fast to enable us to reach the mast-head in time to form a correct estimate of its extreme length, but from what we saw from the deck we conclude that it must have been over 200 feet long. The boatswain and several of the crew who observed it from the topgallant forecastle state that it was more than double the length of the ship, in which case it must have been 500 feet; be that as it may, I am convinced that it belonged to the serpent tribe; it was of a dark colour about the head, and was covered with several white spots. Having a press of canvass on the ship at the time I was unable to round to without risk, and therefore was precluded from getting another sight of this leviathan of the deep.

"George Henry Harrington, Commander.
"William Davies, Chief Officer.
"Edward Wheeler, Second Officer."

The Sea-Serpent.—In your paper of the 5th inst. is a letter from Captain Harrington, of the ship 'Castilian,' stating his belief that he had seen the great sea-serpent near St. Helena. His confidence is strengthened from the fact of something similar having been seen by Her Majesty's ship 'Dædalus' near the same position. The following circumstance, which occurred on board the ship 'Pekin,' then belonging to Messrs. T. and W. Smith, on her passage from Moulmein, may be of some service respecting this "queer fish." On December 28th, 1848, being then in lat. 26 S., long. 6 E., nearly calm, ship having only steerage way, saw about half a mile on port beam a very extraordinary-looking thing in the water, of considerable length. With the telescope we could plainly discern a huge head and neck, covered with a long shaggy-looking kind of mane, which it kept lifting at intervals out of the water. This was seen by all hands, and declared to be the great sea-serpent. I determined on knowing something about it, and accordingly lowered a boat, in which my chief officer and four men went, taking with them a long small line in case it should be required. I watched them very anxiously, and the monster seemed not to regard their approach. At length they got close to the head. They seemed to hesitate, and then busy themselves with the line, the monster all the time ducking its head, and showing its great length. Presently the boat began pulling towards the ship, the monster following slowly. In about half an hour they got alongside; a tackle was got on the main yard and it was hoisted on board. It appeared somewhat supple when hanging, but so completely covered with snaky-looking barnacles about 18 inches long, that we had it some time on board before it was discovered to be a piece of gigantic sea-weed, 20 feet long and 4 inches diameter, the root end of which appeared when in the water like the head of the animal, and the motion given by the sea caused it to seem alive. In a few days it dried up to a hollow tube, and as it had a rather offensive smell was thrown overboard. I had only been a short time in England when the 'Dædalus' arrived and reported having seen the great sea-serpent,—to the best of my recollection near the same locality, and which I have no doubt was a piece of the same weed. So like a huge living monster did this appear, that had circumstances prevented my sending a boat to it I should certainly have believed I had seen the great sea-snake.—*Frederick Smith; Newcastle-on-Tyne, February* 10, 1858.—*From the 'Times.'*

["The plants of this family (Laminariaceæ) are almost all of large size, and many of them gigantic, greatly exceeding in bulk any other marine vegetables. The Oar-weeds and Tangle of our own coasts have frequently stems six or eight feet long, and fronds expanding from their summits to as great a length; and the Sea-thong (Chorda) often measures forty feet in length. But these dimensions are small, compared with their kindred on the shores of the Pacific Ocean. The Nereocystis, a plant of this family inhabiting the north-western shores of America, has a stem, no thicker than whipcord, but upwards of 300 feet in length, bearing at its apex a huge vesicle, six or seven feet long, shaped like a barrel, and crowned with a tuft of upwards of fifty forked leaves, each from 30 to 40 feet in length. The vesicle, being filled with air, buoys up this immense frond, which lies stretched along the surface of the sea: here the sea-otter has his favorite lair, resting himself upon the vesicle, or hiding among the leaves while he pursues his fishing. The cord-like stem which anchors this floating tree must be of considerable strength; and, accordingly, we find it used as a fishing-line by the natives of the coast."—*Harvey's British Algæ*, p. 27.—Ed.]

Proceedings of Societies.

Zoological Society.

January 12, 1858.

Mr. Sclater exhibited a small collection of birds lately transmitted by Mr. Thos. Bridges (Corr. Member) from Northern California, accompanied with notes on their localities, habits, &c., by the collector. Two species, both belonging to the family Picidæ (woodpeckers), were pointed out as of great interest: one of these was the elegant Melanerpes albolarvatus, lately described and figured by Mr. Cassin, of Philadelphia, and hitherto unknown in European collections: several specimens of both sexes of this bird were obtained by Mr. Bridges in Trinity Valley, where it is not uncommon in the pine forests. The other Mr. Sclater considered as probably new to science, and he proposed to call it Melanerpes rubrigularis: it was found in the same locality, but is represented as very rare, only one specimen having been procured.

The Secretary read a "Monograph of the Genus Nyctophilus," by Mr. R. F. Tomes. The characters of this genus were first briefly given by Dr. Leach, in a communication to the Linnean Society read in March, 1820, but not published until 1822. In describing the teeth of the lower jaw, Mr. Tomes considered that two errors which have been made respecting their number required correction. Dr. Leach states that the lower incisors are six in number, and M. Temminck, describing afterwards from the same specimen, could only find four. After diligently examining a considerable number of skulls, Mr. Tomes satisfied himself that the account given by Dr. Leach is correct, for in no instance could he discover less than six lower incisors; but in two examples the outer one on each side is wholly hidden by the one next to it, so that, unless the skull be carefully cleared of the investing membranes, it would be extremely difficult to see more than four of these teeth: hence has probably arisen the error. In the course of the paper Mr. Tomes gives descriptions of two new species under the following names,—Nyctophilus Gouldi and N. unicolor.

The Secretary next read a paper by Dr. L. Pfeiffer, containing descriptions of eleven new species of land shells, from the collection of Mr. Cuming. They were characterized under the following names, viz.—Helix Wallacei, Testudo, congener, Purchasi and Fricki, Achatinella (Newcombia) cinnamomea, gemma, sulcata and minnis, Cylindrella eximia and Bulimus Binneyanus.

The Secretary also read a paper by Mr. Hanley, containing descriptions of a new Cyrena from Ceylon, and of new Siphonariæ, and which he named as follows,—Cyrena Tennantii, Siphonaria brunnea, Carbo, parma, exulorum and redimiculum (var.).

Dr. Gray read a paper on a new arrangement of species in the genus Oliva.

Tuesday, January 26, 1858.—P. L. Sclater, Esq., F.L.S., in the Chair.

Dr. Harley made some further observations on the anatomy of a new species of Pentastoma found by him in the lung and air-sac of an Egyptian Cobra, an interesting paper on which was read before the Society in June last.

The Secretary read a notice of a new genus of Uropeltidæ from Ceylon, in the

collection of the British Museum, by Dr. Gray. The species was characterized under the name of Mitylia Gerrardi.

The Secretary also read a paper, by the same author, on the bosch-vark (*Potamochærus africanus*) living in the Society's Gardens. Some doubt having been expressed as to the distinctness of the painted pig of the Cameroons from the bosch-vark of the Cape, it was with great pleasure Dr. Gray was enabled to examine a living specimen of the latter, and he is quite convinced that any one who examines the two living animals, as they are placed side by side in the Gardens, cannot fail to be satisfied with the distinctness of the species, independent of any variation that may occur in the ground-colour of the individual.

The Chairman read some notes on a collection of birds received by M. Verreaux, of Paris, from the Rio Napo, in the Republic of Eçuador, and stated that, although several small collections of birds had been already received in Europe from this locality (one of which he had formerly brought before the notice of the Society), the present was larger and of a more interesting nature, embracing no less than 170 species, at least 20 of which appeared to be undescribed. The most noticeable objects were two Tanagers, which seemed not only generically but specifically different from anything hitherto known, and which were characterized as Creurgops verticalis and Euchætes coccineus,—a fine series of Formicariidæ, embracing 33 species, of which several appeared to be undescribed,—and a new form belonging to the peculiar South-American family Pteroptochidæ, for which the name Agathopus micropterus was proposed. The Chairman stated that M. Jules Verreaux had previously examined and labelled the birds of this collection, and that the greater part of the new appellations were adapted from his MS.

The Chairman also called the attention of the Society to a very scarce parrot lately acquired for the Menagerie, and of which only one other specimen was known, formerly living in the Zoological Gardens at Amsterdam, and now in their Museum. This was the Eclectus Cornelia of Prince Bonaparte.

Tuesday, February 9, 1858.—Dr. Gray, F.R.S., V.P., in the Chair.

The Secretary read a paper 'On the Characters of four Species of Bats inhabiting Europe and Asia, and the Description of a new Vespertilio inhabiting Madagascar,' by R. F. Tomes, Esq. After some lengthened remarks on the characters of the following species, viz. Vespertilio emarginatus, *Horsf.*, V. formosa, *Hodgs.*, V. rufo-pictus, *Waterh.*, and V. Pearsonii, *Horsf.*, the paper concluded by describing a new species from Madagascar, which was characterized under the name of Vespertilio madagascariensis.

Mr. Gould exhibited to the meeting British specimens of the Motacilla flava of Ray, which had been shot by Mr. Thirtle, of Lowestoft.

Mr. Gould also called the attention of the meeting to three beautiful specimens of Steller's duck, which had been brought for exhibition by Mr. Stevens.

The Secretary read a paper by M. Deshayes, on new shells from the collections of Mr. Cuming and himself, in which were descriptions of 75 new species of the genus Terebra.

Dr. Gray read a paper 'On a New Genus of Mytilidæ, and on some distorted forms which occur among Bivalve Shells.'

Dr. Gray also read a paper containing 'Observations on the Genus Nerita and their Operculum.' His study of Mollusca had proved to him that few parts offer more important and better characters for separation of the families, genera and species, than the operculum; and he proceeded to show how well this was illustrated in the family Neritidæ.—*D. W. M.*

ENTOMOLOGICAL SOCIETY.

Anniversary Meeting, January 25, 1858.—W. WILSON SAUNDERS, Esq., President, in the Chair.

F. Smith, J. T. Syme, J. O. Westwood, and J. S. Wilkinson, Esqrs., were elected Members of the Council, in the room of J. Lubbock, H. T. Stainton, G. R. Waterhouse, and T. V. Wollaston, Esqrs.; and the following were elected to fill the respective offices for the year: Dr, J. E. Gray, President; S. Stevens, Esq., Treasurer; E. Shepherd and E. W. Janson, Esqrs., Secretaries.

The Report of the Council to the Society, which stated that the typical specimens had been withdrawn from the collection of exotic insects, and recommended a speedy sale of the remainder, was read and received.

Mr. Stainton, one of the Auditors, read an abstract of the Treasurer's accounts, showing a balance of £75 9*s.* 6*d.* in favour of the Society, above all liabilities.

The President delivered an Address on the affairs of the Society and the general progress of the Science, for which, and his able services to the Society during his term of office, the Meeting passed a cordial vote of thanks, with a request that he would allow his address to be printed.

The President, in returning thanks, expressed his willingness to print the Address at his own expense.

A vote of thanks was then passed to the Treasurer and Secretaries, for their services to the Society.

February 1, 1858.—F. SMITH, Esq., in the Chair.

The Secretary read a letter from the President of the Society, Dr. J. E. Gray (who was unavoidably absent), in which he nominated as Vice-Presidents for the year W. W. Saunders, Esq., J. O. Westwood, Esq., and F. Smith, Esq.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Transactions of the Linnean Society,' Vol. xxii., Part 2; presented by the Society. 'Mémoires d'Entomologie publiés par la Société Entomologique des Pays-Bas,' Livraisons 1, 2 & 3; by the Society. 'Exotic Butterflies,' Part 25; by W. W. Saunders, Esq. 'Genera des Coléoptères,' Tome iv.; by the Author, Prof. Lacordaire. 'Proceedings of the Royal Society,' Vol. ix., No. 28; by the Society. 'The

Literary Gazette' for January; by the Editor. 'The Journal of the Society of Arts' for January; by the Editor. 'Biographical Notice of the late Professor Carlo Passerini.' 'The Zoologist' for February; by the Editor. 'Description de Longicornes Nouveaux du vieux Calabar,' par M. A. Chevrolat; by the Author. 'Linnæa Entomologica,' Zwölfte Band; by the Entomological Society of Stettin.

Election of a Member.

R. B. Were, Esq., 35, Osborne Terrace, Clapham Road (formerly a Subscriber to the Society), was balloted for and elected a Member.

Exhibitions.

Mr. Stevens exhibited some Lepidoptera and Coleoptera sent from Port Natal by M. Gueinzius: amongst the former were specimens of Charaxis, Zoolina, Sælamis, Cloantha, and some beautiful species of Bombycidæ; also an Adela closely resembling the A. Degeerella of Europe: the Coleoptera included Hypselogenia geotrupina, Sternetornus Bohemanni, Eunostus Gueinzii, and eight species of Paussus.

Mr. Stevens observed that Eunostus Gueinzii was stated by M. Gueinzius to be nocturnal in its habits, and this appeared to be generally the case with pale-coloured insects: the pale Megacephala taken by Mr. Bates on the Amazon was said by him to be a strictly nocturnal species.

Mr. Smith observed, in corroboration of this theory, that the pale-coloured Vespa Doryloides, *Sauss.*, lately sent home by Mr. Wallace from Borneo, was said to be found at night only, which was the more interesting as no other species of wasp was yet known to be nocturnal.

The following notes, which accompanied the collection exhibited by Mr Stevens, were communicated by M. Gueinzius:—

On the Habits of Paussidæ, &c.

"Except the specimens of Paussidæ which have been attracted by candle-light, I have never found a specimen elsewhere than in ants' nests, except one, and that a new species, in this collection, which I found in the hot sunshine, sitting upon a blade of grass, no doubt quite accidentally. They all live with species of ants which are carnivorous: Cerapterus, Pleuropterus and Pentaplatarthrus with different larger species, but the true Paussi seem to live only with our small species; at least I have found P. cucullatus, P. Dohrnii, P. Latreillii, P. Shuckardii, and three other species in the collection, all with one and the same species.

"One night last summer I heard a slight tap on a window-pane, as from a grain of gravel: upon going out with the candle I found it was a Paussus (similar to Dohrnii), of which I had not seen a specimen for some years: not half an hour afterwards I heard the same sound on the same window, and found a second specimen. Although I did not observe the sex, there is little doubt that the first specimen was a female, and the second a male. In a number of instances I have observed that the females of Coleoptera move some time before the males. I observed one morning a

female Eudicella Smithii settle on a branch of a shrub before my door; not half an hour after I had removed it a male had settled on the very same spot. An enormous female Sternotornis niveisparsa (attracted by the candle) will strike the window so as nearly to break the pane, when some time after the smaller-sized male will arrive at the same window. In the same way, and under the same circumstances, I have obtained two rare species of smaller Scarites, always in pairs; and so it appears that these beetles are able to trace the flight of the opposite sex through the air, a good while after it has passed. Paussi appear in the month of November, and last during the whole season until April: their caustic juice is squirted out of the sides of the abdomen; part of it evaporates immediately as a blue smoke, distinctly visible by sunlight; the remainder covers both sides of the elytra, and remains as a whitish or pale yellow unctuous matter. I have repeatedly found P. Latreillii in the act of copulation in ants' nests. The specimens are nearly always found in the part of the nest where the eggs and pupæ are deposited; and although I have never yet observed a Paussus in the act of feeding, yet, from the great and mysterious attachment which the ants show them, I am inclined to believe that they feed upon the spoil which the ants convey into the nests, rather than upon their eggs or pupæ: I believe, likewise, that the eggs of the Paussi are there deposited and bred, and it is not impossible that their larvæ are fed by the ants as their own offspring. The sunny sides of the margins of forests are the places where Paussi are generally met with; a piece of old dry wood is seldom found without an ants' nest beneath it (stones get too hot in the sun): when the weather is very dry they remain below ground, but when moist they ascend and carry their eggs and pupæ to the surface under the wood: when this shelter is carefully lifted up on one side, I have often observed a Paussus (P. Dohrnii, cucullatus or Latreillii), surrounded and covered with ants, apparently sucking nourishment out of him, and fondling him all the time with their antennæ, as they do the Aphides and larvæ of Centroti, and other lamellicorn Coleoptera found with ants.

"When the alarm is given in a nest, and all is hurry and bustle to save eggs and pupæ, two or three ants will seize the sluggish Paussus by the antennæ, and he is quickly hurried below with the rest. I can discern no difference in the odour emitted by P. cucullatus and P. Latreillii, when exploding, and that which is perceived on opening an ants' nest on a hot day."

Captain Cox exhibited some diagrams illustrating the economy of Scolytus destructor, and read the following communication, pursuant to notice given at the last Meeting:—

On the Ravages of Scolytus destructor.

"Ten years have nearly elapsed since the Royal Botanic Society of London awarded me their medal, and had my Paper (read before the Society in 1848) published for distribution among the Fellows and Members. Mr. R. Marnock (the Curator) then stated 'that the results of the operations recommended in that Paper had been most satisfactory, and had proved highly beneficial to the trees.' As I feel certain that I shall nearly stand alone in the views I have taken of the habits of the Scolytus destructor, it is most essential that I should avail myself of the powerful testimony of the award made by the Royal Botanic Society of London, and of the report of the

Curator, to assist me in bringing conclusive evidence before you that we are now perfectly acquainted with the true habits of the Scolytus destructor, and the means of arresting its future progress; it is most peculiarly fitting now that Science should step in and prove that over one pest at least we have power, and if not made use of the fault lies entirely with the public.

"Among the various pests that are constantly claiming attention by their obnoxious powers, the Scolytus destructor holds no mean rank: the elm is one of the most useful trees we have in this country; it suits our climate, is extremely ornamental and flourishes where others would not thrive so well, its timber is made use of in various ways, and therefore its preservation is alike advantageous to our ornamental parks and woodland scenery. Previous to 1840 the Scolytus destructor was known, but its habits not perfectly understood: it was during the formation of the Royal Botanic Gardens that my attention was first directed to the sickly state of the elms forming the belt of the inner circle of the Regent's Park; the axe was constantly being applied, and large and increasing gaps pointed to where the trees had stood and where destruction was going on: on enquiring of the parties laying out the grounds as to the cause of the premature decay of these fine young trees, I was informed that 'some had perished by having an inner embankment formed to prevent parties outside the garden from looking over, and consequently a portion of earth had been raised round their stems, and that others had died, and were dying from their roots entering the gravel.' Now, if this latter information were true, I could not understand why the circle of trees, separated by only a few yards from them, and forming the next circle, were healthy, all being of the same age. In all cases where the destruction was going on I found the Scolytus in great profusion: on mentioning this circumstance to the Curator, the old stereotyped answer came in due form, 'that this beetle always attacked sickly and deceased elms, and were since to be found in all places where this timber had fallen or had been conveyed, either decaying along the road-side or drawn into the timber-yard.' Now, in the first place, I was not satisfied in my own mind that the trees were perishing from the assigned causes; the coincidence was too remarkable not to be noticed, and I felt sure that there was something more than the embanking and gravel to account for the rapid death of so many young trees in different parts of the belt, more especially as my attention had been called, in 1842, to the state of the trees in St. James' Park; with a very little reflection I felt convinced that insects had something at least to do with the matter, and that among them, if the Scolytus destructor were not the first and absolute cause, their presence acted most injuriously by still more disabling the already impeded circulation of the sap: being fully impressed, after further close and most attentive examination into the subject, of their powerful influence, I made it my business to study their habits, and soon became so far master of them that I was induced, in 1843, to read a paper upon the subject before the Royal Botanic Society, and detailed a mode of treatment I felt almost certain would succeed: as the trees in the park belong to Her Majesty's Woods and Forests, the Council of the Society applied for permission to allow me to experiment upon some, and a row of eighteen, fairly selected, were placed at my disposal.

"The following eighteen trees were granted by the Commissioners of Woods and Forests in 1843:—

No.	Scolytus.	Cossus.	Condition—1843.	Condition—1847.	Condition—1849.
1	„ *	0	Slightly.	Nearly recovered.	Recovered.
2	„	„	Most severely, dying.	Dead.	Dead, removed.
3	„	„	Most severely.	Nearly recovered.	Recovered.
4	0	„	Slightly.	Recovered.	Do.
5	„	0	Do.	Do.	Do.
6	„	0	Do.	Do.	Do.
7	„	„	Severely.	Do.	Do.
8	„	„	Slightly.	Do.	Do.
9	„	„	Most severely.	Nearly recovered.	Do.
10	0	„	Slightly.	Recovered.	Do.
11	„	„	Very severely.	Do.	Do.
12	0	„	Slightly.	Do.	Do.
13	„	„	Very severely.	Do.	Do.
14	0	„	Slightly.	Do.	Do.
15	„	„	Most severely.	Nearly recovered.	Do.
16	0	„	Do.	Do.	Do.
17	„	„	Slightly.	Do.	Do.
18	0	„	Most severely	Do.	Do.

"From this table the condition of the trees will be seen previous to being submitted to my plan. Now, before we proceed to speak of treatment, there are two very important stages to be settled: first, is the tree diseased before it is attacked by the Scolytus? and, in the second place, does the attack of the Scolytus prove injurious to the tree?

"As regards the condition of the tree, I think we had in the Garden of the Royal Botanic Society a sufficient number of sickly ones to enable us to come to a very fair conclusion. The number first planted was 242; in 1843, 67 had a healthy appearance; 66 were attacked by the Scolytus, 10 by the larvæ of Cossus Ligniperda; 99 had sickened or died, and had been cut down, 62 of which sprouted again, and 37 quite perished. With respect to the condition of the healthy ones, the embankment equally adjoined them in places; but of the 18 that were allotted to me no embankment existed; therefore this could not have been the cause of Nos. 2, 3, 7, 9, 11, 13, 15, 16 and 18 having such a sickly appearance; and if it arose from their roots penetrating a gravelly soil, the mere fact of partially barking could by no possibility restore them to health and vigour. I think we may fairly say that this is a self-evident proposition. And, again, what is the appearance of a tree languishing from defective soil? We see it first in the leaf, which is small and unhealthy in colour; the terminal branches next gradually decay, piece after piece breaking away, until the longer branches present what is generally called a 'stag-horned appearance,' and the tree finally perishes; but this is not brought about in a day or a week, being usually the affair of some few years, for as long as nutriment can be obtained the crippled tree exists in its withering and fading condition. But when we find a tree dead, with terminal branches profuse and perfect, we certainly, under ordinary circumstances, should not say that tree had died from defective nutrition in the soil, but that, from

* The presence of either Scolytus destructor or Cossus larvæ is indicated by „ according to the heading of the column in which they appear.

some cause or another, it had suddenly, as it were, come to an untimely end; and such a tree we had in the Gardens; I watched it in its beauty, and in three years saw it cut down and carried away dead; but what a sight met our view on removing the bark!—the surface of the trunk, as many gentlemen will remember (for I exhibited a piece of it, 3 feet long, before this Society), was beautifully scored by the lateral tubes of the Scolytus larvæ; and we reckoned that this solitary tree gave birth to no less than the prodigious number of 280,000 perfect insects! Well may we be transfixed with astonishment; but the greater wonder is that an elm should still be found to grace our ornamental parks. I may now fairly presume to state that the 18 sickly trees were not in the least suffering from defective nourishment at the roots, nor had their stems been embanked in soil; and yet many of them were evidently dying; but one thing was very apparent, namely, that in proportion to the sickly condition of the tree so we found the increase of Scolyti. And this leads us to the second question,—Does the attack of the Scolytus prove injurious to the tree?

"The Scolytus destructor is known to many present; it is a small dark beetle, belonging to the family Bostricidæ of Leach. When the first warmth of spring sets in the perfect insect escapes from beneath the bark, by eating its way out; the female soon after selects a tree for the purpose of depositing her ova; she commences her perforation always beneath a little projecting piece of bark at the upper end of a crack; she bores inwards and upwards until on the surface of the alburnum, when she ascends direct; the tube thus formed is from 2 to $3\frac{1}{2}$ inches in length, $\frac{3}{4}$ths of a line in diameter, and of equal size throughout, except at a short distance from its entrance, where a small cavity is usually found sufficiently large to allow the parent insect to turn; on each side, in small crenules, she deposits her eggs as she advances, and closes the aperture with some plastic material; the number of eggs is in proportion to the length of tube (and this is very much influenced by the condition of the under surface of the bark, for if the Scolyti abound the parent ceases boring, so as not to perforate the workings of another when she approaches it); only a small septum divides each; there are generally from 60 to 70. On bursting their shells the young larvæ immediately commence feeding on the last deposit of alburnum; they at first form parallel transverse lines or tubes, which are seen to gradually enlarge and diverge, and are filled with exuviæ as the larvæ progress onwards; their increasing size now oblige those larvæ first hatched to bore downwards, the centre ones outwards, and the last upwards; here they continue to feed during the summer, autumn and winter (if mild): when full-grown they form a case, in which they change to the pupa state; and then, at the end of May or beginning of June, they eat their way out through the substance of the bark, and leave those shot-like holes showing their plan of exit: they now fly about for a short time, and then the females commence the process for perpetuating their species, by laying their eggs. I believe after they have once commenced boring and depositing their ova they never take wing again: as soon as the female has deposited all her eggs, with her head pointing inwards, she dies at the entrance of her tube, thus, as it were, even in death performing a maternal duty, by closing the aperture to her young ones with her dead body. It is very rare to find a parent tube without the insect, although no doubt they occasionally become a prey to various smaller insects. It is the frass the female ejects from the tube that leads to the detection of the presence of the brood, for were it not for this fortunate circumstance we should never be apprised of the destruction going on within the tree until the escape of the mature insect, in spring, shows the exit-holes.

"I will not trespass more now into detail, but simply state that each family will destroy nearly four square inches of bark. Granting, therefore, even the possibility of the Scolyti being attracted by the sickening state of a tree, here we find one parent insect has the power of destroying a large portion of bark, and consequently must rapidly hasten the final decay. No doubt where the insect abounds it will perforate the bark of fresh-hewed timber; but I have never found one specimen in an elm whose juices were dried up. Therefore, irrespective of the cause of disease, it must be unanimously granted that an insect which can destroy four square inches of bark by detaching it from the alburnum must prove highly destructive, and, whilst permitted to remain, frustrate any attempt to restore health. If, in the absence of any true and logical cause, we have found elm trees sickening and dying, and their bark bearing the unequivocal signs of the Scolyti, and simply by a process of partial barking and removing the Scolyti larvæ, we arrest the decay of those not too far advanced, and in a comparatively short period restore them to health and beauty, we have every rational right to infer that the Scolyti, and the Scolyti alone, were the aggressors in the first instance, and destroyers in the second; and still more, that when we find the whole of the diseased trees in the Royal Botanic Gardens perfectly recovered in 1849, and now (1858) bearing all the impress of vigour, so that in many the fearful scars once made are now hidden from sight, and buried by the overlapping of succeeding yearly deposits, I think this Society will ask no further proofs at my hands of the sound and practical results that have followed the simple and easy process of partial barking; that the lapse of so many years establishes beyond a doubt its great utility; and that, in the absence of any other advanced system for arresting the spread of the Scolyti in particular, this plan ought to be strongly advocated ere another year sends forth its thousands to still more diminish the number of these noble and beautiful ornaments to our parks and pleasure-grounds.

"The plan I adopt for destroying the insect is very simple: as the frass always indicates the aperture to the tube, and as this always ascends directly upwards, so by paring off the old exuvial bark we lay bare the tube and completely destroy the young brood. I strongly advocate clearing off all the old bark of elms where the Scolyti abound: in the first place, the trees actually seem to improve by the process; in the next place, the Scolyti cannot find the shelter of the overhanging bark, and therefore are more liable to become the prey of birds; and finally, you detect at once the presence of any fresh attack. I believe the process adopted in France, of taking the whole bark off down to the alburnum, is fraught with great risk; it did not succeed in a tree that I saw, nor can I conceive a more unnatural operation. I merely cut the insect out, the tree is scarcely injured by the process, and a few years obliterates all trace of the operation. The instrument I prefer is a simple draw-shave, known to coopers and carpenters; it is very easily used, and answers the purpose admirably: in using it all we have to do is to cut down to the parent tube, and then lay bare the lateral tubes to their end, taking care that no larvæ remain; the healthy alburnum is therefore not injured, 'causa sublata æger verelescit.'"

Mr. S. S. Saunders read a paper intituled "Observations on the Habits of the Dipterous Genus Conops," and exhibited the larva, pupa and imago of a species of that genus, which he had reared from Pompilus audax.

Mr. Westwood read the description of a new genus of Carabideous insects, belonging to the Scaritides, having the outward appearance of the Heteromerous genus

Adelostoma (differing from all the known Scaritides in the opaque surface of the body), and remarkable for the two deep oblique canals on the under side of the head, united behind in front of the very small neck, and within which the antennæ are lodged when at rest. The genus is founded on a single species recently sent from the River Amazon by Mr. Bates, to which Mr. Westwood applied the name of Solenogenys fæda.

Part VI. of the current volume of the Society's 'Transactions' was on the table.—*E. S.*

DUBLIN UNIVERSITY ZOOLOGICAL AND BOTANICAL ASSOCIATION.

January 15, 1858.—Professor W. H. HARVEY, M.D., F.L.S., in the Chair.

The minutes of last General Meeting being read, were approved of and signed by the Chairman.

Mr. E. Percival Wright read a *resumé* of a paper on the classification of the Cœlenterata, which had been laid before the Association in December last by Professor J. Reay Greene, of Cork.

He also made some remarks on our knowledge of parthenogenesis, a subject about which much had been written by Owen, Waldo, Burnett, Sallock, Huxley, Siebold and others. Not that all these authors used the word to express the same idea—perhaps the term should be limited, as it is by Siebold, to the production of a perfect individual from a germ cell, without it receiving any stimulus from the sperm cell. It is known, to use the language of Quatrefages, that both in plants and animals the concurrence of two agents is necessary in order to assure the perpetuity of species. Among plants flowers are generally both male and female, thus realizing one of the most graceful fictions of pagan mythology. Around the pistil which encloses the ovule are grouped the stamens, whose pollen is destined to fecundate this germ and to determine its development under the form of seed or fruit. In many cases, however, the sexes are separated. Growing sometimes on the same tree, and sometimes on different trees, the male and female flowers require the aid of some intermediate agent to effect their union, and thus the winds convey to the pistil of these flowers the vivifying emanations by which alone it can be fructified. These diverse relations are all to be met with in the animal kingdom. Here also the myth of the son of Venus and Mercury becomes a reality, and here the ocean's wave and the river currrent takes the place of the winds of heaven. This general law had, however, some exceptions, and the startling revelations of Dzierzon, pastor of Carlsmarkt, in Silesia, as told us by Siebold, show how that the eggs which the queen bee lays the moment she emerges from her chrysalis state are developed into drone bees.

Professor Harvey had been greatly pleased with Mr. J. Reay Greene's paper, which was on a very interesting subject. It was well known that the male plant of one of the Euphorbiacea had never yet been discovered, and yet the female flowers produced perfect seeds, which, on being sown, in their turn produced perfect plants.

Professor Kinahan read a list of the various ferns found in Powerscourt demesne on the last excursion of the Association.

The Rev. Eugene O'Meara also read a list of the Diatomacea found upon the same occasion, and exhibited specimens under his microscope.

Professor R. W. Smith gave an account, illustrated by sketches, of some curious monstrosities of ferns he had lately discovered.

Professor Harvey read a paper on a new form of fibro-cellular tissue which he had discovered in an Alga from the Reef of Florida.

Professor Kinahan read a paper on the unusual character of the present season.

Mr. Bailey exhibited a fine pair of the great Goliath beetle, and also a Longicorn taken from timber in the Crimea.

The thanks of the members were given to Mr. Bailey.

Mr. Edwin Birchall exhibited a collection of Lepidoptera taken on the Swiss Alps.

The Director of the Museum exhibited some rare Mollusca, collected by Dr. Harvey; among them the fine orange cowry, the rare Cypræa umbilicata, C. Scottii, and the pretty Trigonia pectinata, the sole living representative of an extensive genus of fossil shells.

Visitors having withdrawn, the following were, after ballot, duly elected as ordinary members,—T. M. Dolan, A. H. Hamilton, R. J. Montgomery, J. H. Nicholson, and E. J. Smyth: as corresponding member,—C. Spence Bate, F.L.S., of Plymouth.

Dublin Natural-History Society.

Friday, February 5, 1858.—The President in the Chair.

Mr. W. Andrews, Hon. Secretary, read a note on the capture of the mute swan in Dundalk Bay, already communicated to the 'Zoologist' by Lord Clermont.

Dr. Kinahan read the following

Notes on the Subaqueous Habits of the Water Ouzel.

"During the years 1849 and 1850, having nearly daily occasion to frequent that part of the river Dodder which passes through the romantic mountain glens of Glenismael and Castlekelly, the great abundance there of the water ouzel, or, as the peasantry there call it, kingfisher, induced me to study its habits somewhat particularly. I have repeatedly seen them rise to the surface to obtain air, which they do exactly like a grebe, merely raising the tip of the bill out of the water. The bird has several modes of diving. When seeking food it generally goes down, like most divers, head foremost, in an oblique direction, or else walks deliberately in from the shallow edge of the pool, the head bent down and the knees (tarsal articulation) crouched. When seeking refuge, however, it sometimes sinks like a stone, exactly as the great northern diver (*Colymbus glacialis*) has been observed to do,—that is, gradually, without any apparent exertion, sometimes in the midst of its most rapid flight dropping down suddenly into the water like a plummet. Its course is indifferently with or across the stream, rarely against it. It often remains under water totally submerged for fifty seconds and upwards, and during that time will proceed from 10 to 20 yards: when it comes out the water may be seen running rapidly off its plumage. It swims with great rapidity, and appears to rejoice in the water, as its true element, hardly ever alighting directly on a rock, but even after its longest flight splashing slap into the water, at the base of the stone selected as a resting-place, and then scrambling to the summit of this. In its motions in the water it more closely resembles the jackass penguin than any other aquatic bird I have had an opportunity of studying: like that

bird (especially in the breeding season) the birds may be seen at times leaping right out of the water in their gambols. That the bird actually does possess the power of motion under water, the following notes on a wounded bird, made on the spot, abundantly prove.

"'November 29, 1850.—Bohernabreena. Wounded a water ouzel, which, as I have observed them all to do, immediately made for shore. On my going to seize him he darted into the water, running slap in; waded in after him; under water he looks quite glossy, but does not seem increased in bulk, the glossiness probably arising from the oiled state of the plumage, or else from its peculiar texture. When I first got up with the bird he was perfectly stationary at the bottom, not using any exertion to remain there (this remark applies to two other birds wounded later in the day, which also took to the water). The bird next got under a big stone, and when I poked him out on one side he ran to the other: after the lapse of a minute or so he put his head up out of the water to breathe, always keeping the stone between him and me, and when I tried to catch him he would dodge under water again, and come up on the other side. Finding that I was still chasing him he took to the stream, and went under water faster than I could follow him; he seemed to move now altogether by means of his feet, his wings hanging down behind his tail, though his motions were so quick that it was difficult to be positive as to the latter part of this observation. At times he swam in mid-water, using his wings, crossing the current several times, and seeming but little incommoded by it. All at once he turned over on his back, still possessing the power of continuing under water; struggling to regain his original position, he spun round and round, so that it appeared as though the wounded wing had suddenly failed him, and thus prevented his preserving a due equilibrium in the water. At length he came to the top, when he immediately righted and swam as at other times: every time I tried to lay hold of him he again ducked and dived down to the bottom, at first all right, and then the tumbling began again. When captured, at length, I found him merely winged.' I was enabled to confirm these observations several times that day, as I obtained seven specimens, five of which necessitated a watery chase before I succeeded in catching them, and one got clear off. I ought to explain such seeming needless cruelty in shooting so many of these harmless birds, but the specimens were required for a series of dissections at that time in hand. From these observations it would appear that both feet and wings are used in progression, the latter in mid-stream (when the bird almost looked as if it were flying), the wings doubtless being also of essential use in preserving a proper balance in the water, probably acting like the pectoral fins of a fish. The bird's progression along the bottom was certainly by means of its feet alone.

"Like many water animals the sensation in this bird appears blunted; at least two of those I winged and afterwards captured sat coolly looking at me, as though uninjured, without leaving their position, perking and jerking their tails as unconcernedly as possible, so that had I not had some confidence in my gun I should certainly have taken a second shot at them. The stomachs of all those I examined contained only insect remains. This bird is extremely common in our mountain glens: I have counted as many as ten broods in Saggart Slade, and, although called an unsocial bird, it is to be always found in pairs. These certainly keep apart, but still many pairs will be met in favourable localities in a very limited area. They keep nearly altogether to the glens. I saw the bird but once below Rathfarnham bridge, in the Dodder: this was at dark.

"To conclude. The fearlessness and curious manner of this bird, the harmlessness of its habits, the adaptive power displayed in the curious elongated valve-like opening of the nostrils, the absence of gape-bristles, the partial webs to its feet, the dense peculiar nature of the plumage, and the general dissimilarity between it and the other thrushes, form a group of characters which, taken in combination with the wild and romantic nature of the scenes it mostly loves to frequent, ought to render this bird as great a favourite with the field student as it generally is with the fisher plying his lonely task amidst its secluded haunts, and hailing as an old acquaintance the tidy little white-breasted water blackbird, as it sits jerking and posturing on a rock amidst the boiling waters, swimming on the eddying current, diving beneath its depths, chattering to its mate, or enlivening the mountain glen with its simple but plaintive strain to the fitting and appropriate accompaniment of the ceaseless bubble of the sparkling waters of the gushing mountain rill."

The Secretary read the following communication, by G. Henry Kinahan, C.E., G.S.L.:—

Description of a Starling Roost, at Rathkeale, county Limerick.

"Coming home late one evening after dark, I was surprised, whilst walking along the road to the north of Doohyle Lough, near Rathkeale, to hear a tremendous chattering, which would sometimes suddenly cease, followed by a long continuous whirr, like that of a strong rushing wind. It was then too dark to see anything, and although I knew they must be birds, yet their kind I could not say. I could hear the whirr caused by the flocks getting up nearly the whole way into Rathkeale (over a mile). The next day, on returning the same way, the noise of the preceding night was fully explained by my seeing innumerable starlings congregated about the lake. Some evenings afterwards I went on purpose to watch the birds. I arrived at the spot about half an hour before sunset, and immediately afterwards the birds began to arrive in flocks of about 300 or 400. The first flock flew round the lake, and then alighted in a field to the south; a few minutes more and another flock arrived, which, after flying round the lake, joined the first comers; these immediately rose, and all took a circuit round the fields and then alighted again. Flocks now came in thickly from all sides, the same performance being gone through at each arrival, until the flocks began to come so fast that they had no time to remain on the ground at all. The main flock then adjourned to the lake; arriving there it took two or three circuits of the lake, and then alighted among the reeds: the arrivals now were not so numerous as they had been, but many flocks still came in, and each arrival was the signal for a general move and promenade as before. This procedure was kept up till about half an hour after dark, and then ceased, so that I presume all had arrived in that time (two and a half hours). When I left a constant chattering and gossip was going on among the reeds. I could form no accurate estimate of the numbers that were there; but the reeds on the north of the lake are about a quarter of a mile long and 200 yards wide, and every reed seemed to have half a dozen on it. I could always tell, ever afterwards, when it was getting late, by seeing the starlings going Doohylewards.

"With regard to the breeding-place of starlings: in the Court-house Square, Rathkeale, at the rear of one of the dwellings, there is an old pigeon-house, in which

a lot of starlings build; and the owner of the house says that they remain there summer and winter. I saw them there in the spring, I suppose over forty of them, just as tame as pigeons, about the yard and house."

On Bavarian Sporting.

By the Rev. Alfred Charles Smith, M.A.

(Continued from page 5875.)

Having learned from its worthy editor that my notes on Bavarian Sports are not irrelevant to the pages of the 'Zoologist,' or displeasing to its readers, I at once comply with his request, by sending the following statement of another branch of field pastime, which I have extracted from my journal dated 1840; and I think that whatever opinion may be entertained of the hare and stag and wild boar hunting (which I have described Zool. 5870), all will agree that the horse-racing at Munich is not conducted in a very sportsmanlike manner. It takes place in October at the great Munich Festival, known throughout Bavaria as the "October Fest," to which the lower classes, aye and indeed the upper classes too, look forwards with pleasure for many a week: it lasts four days, and a peculiar beer is brewed for the occasion, which is consumed then, and then only, by law, in astonishing quantities. It is held on a large open plain outside the town, and hither people flock from all the surrounding villages, and many from a considerable distance: the horse-racing is the grand feature of the principal day, and attracts the largest crowd of spectators, though there is but one race, which comes off in the afternoon.

The first thing that strikes a stranger's eye on entering the plain where the racing is to take place is the erection of various booths, near different parts of the course, called "Accident booths," whither those injured in the race may be speedily conveyed on a stretcher: this led us to suspect barbarous proceedings, for, however laudable a precaution such preparations may evince on the part of Bavarians, in England we should have taken measures to prevent accidents at all. However, the sequel showed that the Bavarians were not mistaken in anticipating mishaps, and some of the booths at least were not tenantless ere the race was done; and no wonder, as we shall see: in the first place, as there is but one race, and any horses may start that please, there is quite a crowd of competing racers; and as they go round the course three times, yet all in one heat, and as the course is

about two miles in circuit, these horses, not always in the first racing condition, have had galloping enough long before their six-mile run is concluded. The course is marked out by about a dozen tall white posts, bearing flags, the everlasting sky-blue and white, which meet you at every turn in Bavaria; while ropes on one side, and men on the other, keep the open space tolerably clear. Of course nothing could be done till the king came, and patiently indeed did the spectators wait, though unusually excited too did these phlegmatic Germans become as to the result of their one race, and as to whom should be awarded the honour of victor for the year: speculate indeed they did, and freely did they back their favourites, but the speculation seemed very harmless, and the backing was confined to words of praise and encouragement, for I did not discover that their florins were hazarded on the occasion, or that any betting took place. At length the king and royal party arrived, and proceeded at once to the rough wooden platform prepared for them near the starting and winning post. Now the course was cleared by soldiers and mounted police, and the bell rang for the racers to prepare: thirty-six horses started, and they were all crowded together at a large stout pair of gates fixed across the course, the sudden throwing open of which was to be the signal for the start: the horses were, for the most part, poor lean weak animals, of neither bone nor symmetry, and all ridden by boys in their usual shabby stable dress, distinguished only by calico sleeves of red, yellow, blue, &c., which formed their colours.

Suddenly the gates are thrown open, and off they dash, one over another, helter-skelter, pell-mell: two were knocked over in the rush, and fell where they were; two bolted into the crowd at the sides, from sheer terror, leaving men, women and children sprawling on the ground: all were dashing against each other, so that you could scarcely distinguish to what particular horse any particular rider might belong: all came out pushing, tearing, jostling, kicking, rearing, amid a clatter of hoofs, while the little boys who rode them yelled and spurred and flogged, and the spectators shouted and screamed and applauded. Such was the "start;" never was such confusion or such a barbarous exhibition seen: seven or eight horses and boys were at once put *hors de combat*, and retired; the rest became one by one disentangled from the mass, found their respective places, got away in tolerable order, and came round pretty well together, considering their numbers and the length of the course; but after the first round wind began to tell, and while some gave up altogether, others might be seen straggling in a long string, with considerable intervals

between them, three or four however keeping well together in the front, and the mass following 150 yards in their rear; but when they came round the third and last time all showed unequivocal signs of distress, and though the winner came in 100 yards ahead of the second, and the greater part never attempted to come in at all, they all (winner included) seemed ready to drop with fatigue, and their panting sides and heaving flanks and drooping heads showed how severe the struggle had been, and how little qualified they were—either by shape, training or condition—to run a course of six miles at the top of their speed. And now the accident-booths began to be peopled: one poor man was knocked down by a bolting racer, and had his leg broken thereby; one jockey, whose horse fell with him at the start, had his knee-pan smashed: these two I saw carried off, and I heard that several other *little* trifles of the kind had occurred. On the whole, never was there a more villainous or cruel race, though the king seemed highly delighted with the *sport* (!); and I doubt to which should be attributed the palm for barbarity, the horse-race at Munich, or that at Rome, where the horses—without riders, but with little spurs attached to their backs by springs, which goad them on faster at every stride—are driven out from the barrier with a lash, and dash down the thronged Corso, infuriated with the spur, maddened with the shouts and terrified by the actions of the excited people.

Now to say that the Bavarians are barbarous and cruel in their notions would be to shoot wide of the mark, and not be the truth; but the fact is that they do not understand sport in the English acceptation of the term: if they go out to search for game, they cannot comprehend why they should not shoot a partridge squatting on the ground; still more, why they should not fire into a whole covey of them, and bag all they can: if they can find a hare in her form, of course they will adopt that method which gives the best chance of success, and shoot her as she sits. My notes on the hare, roe and wild-boar hunting exemplify this innate ignorance of the principles of sport in the German breast, and it is further proved by the details of the horse-racing given above. But the Bavarian horse is not made for racing, or for sport of any kind; yet he is an active, strong, useful little fellow, with a broad chest, a sturdy build and a high crest, and he will trot along with a light waggon, or a hackney sledge, at a famous pace, and yet he finds no favour in the eyes of the nobles at Munich and other German capitals; there English horses are the rage, and the very name of an English horse goes a long way in his favour. The late king's brother (Duke Max) was notorious for his love of

horses and horsemanship, and in his own palace he fitted up a small amphitheatre, solely for equestrian feats; and though an English "Milord" was always the grand butt of the evening, the said English nobleman being dressed in a red hunting coat, a cocked hat, and a pair of Hessian boots, armed with an enormous pair of spurs and a large hunting-whip, supposed to represent the usual modern English costume in high life,—and though he was very fond of "rost-beef," sold his wife in Smithfield, and swore a good deal, the three great characteristics of Englishmen in every foreigner's mind,—yet it was always their best rider who represented Milord; and though he said and did many ridiculous things, he never failed in performing on horseback all kinds of marvellous feats, which made German eyes open with admiration and astonishment, such an idea have they of the prowess of the English in this respect. Not only however for the Circus, but for ordinary purposes Duke Max had a notoriously fine stud of horses, most of them imported from England, and all of considerable value: at the head of this department was a pleasant smart riding-master, with whom we after exchanged a few words as we met him in our daily rides: on one occasion he was mounted on a magnificent bay horse, which he told us with honest pride was his own private property, a veritable "Englander," just imported and presented to him by the duke, and that he had already refused for him the almost fabulous sum in Germany of 100 Napoleons. As he told us this we were riding on the road near Munich, and after we had duly admired his really handsome horse, which he showed off to the best advantage, for he rode well, he wished us adieu, and, turning off the road into the neighbouring stubble (for there were no fences or ditches to intercept him), away he started at a gallop, evidently wishing to show off his horse to the English. Now, at some hundred yards from the road, there chanced to be a strong net stretched across a part of the plain, about breast high, intended to keep in roe, or hares, or for some similar purpose: the net hung from a stout rope, which was stretched from posts fixed in the ground at considerable intervals: the afternoon was foggy, and we could not see this net in the mist, nor, it seems, did the riding-master; for what was our astonishment, while watching him gallop away, to see horse and man suddenly throw a somersault in the air and alight on their respective backs, and from no apparent cause. By the time we had reached the spot the riding-master had regained his legs, shaken himself, and was not much hurt: not so the poor horse; his back was broken, and he lay struggling and plunging, but unable to get up; and though, with the help of

some peasants, a rope and a stout ladder, the horse was carried to a neighbouring farm, it was of no use, and we learned from the riding-master a few days after that it had been found necessary to shoot him. But I must apologize for another digression, into which I have been inadvertently led in my attempt to draw a picture of Bavarian sport. I am well aware that the term "sport" thus applied will not meet the ideas of an Englishman; indeed the word as used by a German is not at all synonymous with the word as used by ourselves; for with regard to shooting, I was saying that the sole idea of the Germans is to *obtain* the animals they seek, without reference to any laws of honour and fairness by which we are governed: they can understand nothing of the term unsportsmanlike, as applied to *any* method of filling the bag, provided that desirable end is attained; and in their eyes to shoot the sparrow or the finch from the bush, or on the ground, is as great *sport* as to shoot the partridge on the wing; and though they take the field in most elaborate hunting costume, armed *cap-a-pie*, and with every possible and many impossible appliances to boot, the result is hardly commensurate with the preparations, and the emptying of the large embroidered game-bag—the unfailing accompaniment of every German gunner—usually displayed a goodly row of our smaller Conirostres, not unmixed with a few Dentirostres as well, relieved here and there with an occasional partridge or quail, these latter birds "rari nantes in gurgite vasto," proving the truth of the adage that "all is fish that comes to the German net."

And again, to revert once more to their horsemanship, the very glimpse of a German on horseback shows what a sorry seat he has; but as hunting is unknown there, and you may roam over the vast plains of Bavaria without meeting the ghost of a hedge or ditch, his erect immoveable seat in the saddle and military mode of riding, however ungraceful in our eyes, is perfection in theirs, and answers their purpose; and they ridicule without mercy the English style, while they totally disbelieve the possibility of fencing, as they read or hear of it in an English hunt,—a disbelief, by the way, very general on the Continent, where we have a very great character for exaggeration, and very small repute for truthfulness in these matters; and I shall never forget the shouts of ridicule, and remarks of disbelief, in which I overheard two smart young French officers indulge, when gazing through the window of a print-shop in Paris, at some admirable English pictures of hunting and steeple-chase scenes, which they did not scruple to denounce as absurd caricatures, total impossibilities and falsehoods.

But to bring this long paper to a close, I apprehend (and I think the facts narrated above will bear me out) that total innocence of the meaning of the term "sport," so essentially an English word, so utterly known on the Continent, pervades all the out-door recreations of the Germans, characterizes all their exercises in the field, and accounts for the barbarous proceedings in their horse-racing, hunting and shooting, wherein all they look to is the end aimed at, and to attain which they consider all means lawful.

ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne,
February 18, 1858.

Occurrence of the Firecrested Regulus at Penzance.—Three instances of the occurrence of the firecrested Regulus have come to my notice during the past winter: all these have been noticed in a warm sheltered valley, and they appeared to frequent close hedgerows and ivy-clad pollards and bushes. The habits of this species appear more close and retired than those of the common goldcrested Regulus: the latter more frequently appears in large branched trees in open situations, whilst the firecrested Regulus seeks more permanent concealment.—*Edward Hearle Rodd; Penzance, March*, 1858.

Occurrence of the Great Plover at Penzance.—Three examples of the great plover have made their appearance during the last three months: the last I observed on Thursday, March 4th, in good condition. I have mentioned before that all the specimens which have come to my knowledge, in this district, of this summer migrant, have occurred in the *winter* months: the species is wholly (as far as I know) unknown as a summer visitor in the western counties, and I never heard — nor do I know any sportsman or naturalist, in this county or Devonshire, who has heard—the loud nocturnal whistle of this bird in the summer months. White, in his 'History of Selborne,' appears to have been well acquainted with the bird in his neighbourhood.—*Id.*

Note on Sparrows attacking Rats.—While sitting at breakfast one day, in the latter part of last December, my attention was drawn to some ten or twelve house sparrows which were fluttering about in a strange manner on the roof of an adjacent stable, at a particular spot where a water-gutter joined the roof. I presently observed a large rat emerge from the gutter on to the roof, when it was fiercely attacked by all the sparrows, which surrounded it, drove it down the roof, and appeared to have entirely got the mastery over it, when it suddenly made its escape by rushing down a water-pipe which led from the roof into a drain at the foot of the stable. The sparrows then resumed their post at the spot where this rat had first appeared; and very soon a second rat came out on to the roof, at the same place where the other one had first shown itself: the second rat was attacked by the sparrows even more fiercely than the first, and it was not without two severe struggles and one vain attempt that it succeeded in gaining the same pipe in which its predecessor had taken refuge, the sparrows appearing much disconcerted at the escape of their enemy.—*G. W. Guymer; Catton.* The above was communicated to me (in substance) by Mr. Guymer, who is

an intelligent and trustworthy person in this parish.—*J. H. Gurney; Catton, Norfolk, February* 23, 1858.

Contributions towards a Biography of the Partridge.

By the Rev. J. C. Atkinson, M.A.

(Continued from page 5985).

I have often heard it alleged that the partridge suffers much in long-continued severe weather, and that in many instances they succumb altogether. It may be so; but I must say I have never yet met with any decided instance of much apparent injury, from cold or hunger, to a partridge, in the very hardest weather I have ever known. We have had two or three winters, within the last half a dozen years, in which, from the depth of snow and the continuance of the frost, I confess I expected to meet with proofs of its power upon these birds; but with an almost solitary exception of a bird that had been wounded and had not recovered from the effects of its hurt, I cannot say my anticipations were ever fulfilled. On the contrary, the birds I have killed when snow had laid on the ground three or four weeks were as plump and fat as they have been this winter, when the ground has hardly once been fairly covered. Their chief food in seasons of severity seems to be obtained at the bottom of hedges with a south aspect, especially where there is a little oozing of water from want of drainage; indeed at any place which by the same means—the sun's rays or springing water—is kept open or cleared of snow. The grass that is found in such places is eaten closely off, and no doubt any insects or larvæ inhabiting there are eagerly picked up. Again, I have seen them continually, at such times, about the edges of a running stream; sometimes at the water's edge; more generally under the snow drifts on the bank, especially where the bank faced the sun. A place abounding with tufts of rushes, and of course therefore with more or less of moisture both above and below, is much frequented by them in severe weather; and there are many places in my beat where, from their answering the description now given, I could at any time, in continued snow and frost, find partridges day after day. That in extreme cases they may suffer extensively may be quite true, but I am convinced, from my own observation here (and a reference to my thermometrical and other weather records, carefully kept, shows how

severe the weather has been for weeks together at the times of observation), that such cases are extremely rare.

There is a question of considerable interest connected with the partridge, to which I have never seen a satisfactory answer, and indeed scarcely a satisfactory attempt at an answer. I mean the nature of the injury—fatal injury—which causes the bird "to tower." In some cases the partridge shot at goes away apparently untouched; in others, gives that slight flinch which many an inexperienced person would take no note of, but which is significant enough to the sportsman's eye; in others again the legs, one or both, of the wounded bird drop, as if paralysed from the thigh joint downwards, it flies with a strange unsteady flight, wavering from side to side,—"wobbling" I have heard it called,—and after a course of a few score yards, or possibly almost half a mile, the bird soars up, sometimes to a great height, and falls almost perpendicularly, and always and most evidently quite dead. When found after towering they almost invariably are seen to lie on their back; sometimes, but by no means invariably, a little blood is oozing from the bill; but very frequently, when the quarry has been shot from some distance, there is no injury whatever apparent as it lies in your hand. It may be said it would be very easy to settle the question by dissection: let the "towered" birds be kept by themselves and carefully examined after the day's sport is over. My answer to that is, that the result would be less satisfactory than it seems likely to be; and for this reason,—that it is so very seldom only one grain of shot strikes a partridge that is brought to bag: so that, even if the shooter has the requisite skill and experience for properly examining so small a body as the partridge's, still out of a hundred cases he might find but one, or not one, with the single wound which had caused death accompanied with towering. I am, in theory only, inclined to suppose there is—at least in some cases—a twofold injury; I mean an injury to two vital parts or organs. I have no doubt when the leg or legs fall or drop that the spine is injured, and I am aware that an injury in the lower part of the heart is not accompanied with instant death.* It is therefore possible at least, that

* "I found, on opening the stag, that the ball had passed through the lower part of his heart, a wound I should have imagined sufficient to have deprived any animal of life and motion instantaneously. But I have shot several deer through the heart, and have observed that when hit low they frequently run from 20 to 80 yards. If, however, the ball has passed through the upper part of the heart, or has cut the large blood-vessels immediately above it, death has been instantaneous, the animal dropping without a struggle."—*St. John's Field Notes*, ii. 90.

where the spine is, by the bird's actions, at once seen to be injured, the shot that inflicted the injury, or indeed another, may have also penetrated or injured the lower portion of the heart. But even when the spine is not at once seen to have sustained injury, I think that from the upward effort just before the fall there is evidence of an affection of the brain, such as would be produced by lesion of some immediately connected parts, *e. g.* the spinal chord. If this suggestion be right the occasional bleeding at the mouth is easily accounted for; the shot that inflicted the fatal injury passed on into the lungs, and hence the hæmorrhage at the bill.

I am the more inclined to suppose my hypothesis may be well founded from the actions, often to be observed, of a bird shot in the head, so that the brain is obviously injured, while great vigour of action is still left to the sufferer. I have many times observed a partridge thus wounded fall, generally, but not by any means invariably, to the shot; but on going to pick it up it has taken wing again, and flown upwards in much the same aimless manner as the towering bird does, only not so high, and then again come to the ground with considerable violence. Such birds often require a second charge of shot before they can be secured.

The efforts of a wounded partridge to escape are very various, and, for the most part, very energetic. I have sometimes known a winged bird remain just where it fell; but whenever it took place it was in strong cover, such as the ling on the moor, in which locomotion was not easy. Occasionally the bird seems to be so much astonished by its fall that it remains for a space without moving, although the surface it lies upon is quite bare and unsuggestive of concealment; but usually they take to their legs immediately, and seek the nearest covert available. I have seen them take refuge in the holes of our dry stone walls, in holes scratched by rabbits, at the entrances of drains, under the overhanging banks of a water-course, among the roots of a tree, as well as in thick herbage or dense coverts; but they do not seem willing to go far into a hole or drain, not beyond reach of a man's arm,—probably deterred by the want of light before them and the unknown terrors of the dark. I have seen them, after being brought by the dog out of water, on accidentally escaping take to the water again, and perhaps seek the same hiding-place from which the dog had just before taken them. In the turnip or potato field they do not, unless much hurt in addition to the broken wing, seem to seek any definite place of shelter or concealment, but keep on the move, though it may be in a rather desultory manner; and thus they

are frequently lost in such places in the earlier portion of the season: they then try the patience of the dog very severely; he is kept so long drawing and pointing, from minute to minute, and with no apparent result, that at last the most steady dog is disposed to rush in: hence many sportsmen are disinclined to use the pointer at all in seeking a wounded bird. A dog I have shot to a good deal is remarkably steady, and his fault is rather in over caution than the want of it; so much so that I can hardly at times get him to advance except in the most tediously careful way: but I have seen him so worried, in high potatoes, by the everlasting running and dodging of a winged bird, which he could never see after working it up and down the rows for a long time, that on coming on to the scent of fresh birds in another part of the field, or in another field, or possibly even another day, he required to be restrained from rushing in as soon as he found the birds were running.

Partridges only winged, or not much hurt otherwise, usually rejoin the covey at nightfall about their usual feeding place, and may be seen in company with them sometimes for weeks afterwards. If they are much hurt it is probable they hide in some hedge, and are soon found and killed by some of the common "vermin" of the fields, whether four-legged or feathered. It is remarkable how very seldom a bird much attenuated by a former wound is met with by the shooter: any one who observes the tracks of the stoat, the polecat, and more rarely the rat, in the snow, together with those of the magpie and the carrion and hooded crows, and remembers how these birds are assisted in their unintermitting search for food by their power of flight, can easily understand the reason. I do not think that a bird wounded, so that its recovery would be either tedious or uncertain, ever lives many hours.

I have sometimes been much astonished at the vast quantity of feathers seen on the ground where a partridge has fallen. Usually (unlike the ringdove, which parts with its feathers with extraordinary facility and in great quantities, a fall against a tree or through the branches of a larch causing them, even those of the tail, to fly about in clouds) a feather or two is all that marks where the bird has fallen, unless so near the shooter as to have been much cut with the shot; but occasionally the feathers lie in handfuls, as if the bird, in some paroxysm of agony, had torn them off itself. The first time I noticed this was in the case of a bird which, as I and my attendant both supposed, had fallen dead after flying some distance from the point at which it had been shot at. Under the impression that "that bird

would lie still eno'," as I said to the person with me, I beat several fields before going to pick it up. On returning for it I was confounded at seeing it rise and fly away,—for I missed it in my hurry and surprise at being called on to take my gun off my shoulder to shoot it again,—but I was more surprised still to see the quantity of feathers it had left behind it in two places a yard or two apart. Even the towered bird does not shake off more than a feather or two, even if that, by its fall from a great height; and this bird had not fallen so much as from a height of 7 or 8 feet, and, as the surface on which it lay was smooth, short grass or sward, I could not account for the circumstance in any way but by supposing the bird had torn them off itself.

J. C. Atkinson.

March, 1858.

Note on the Partridge.—I was much interested in the article on the partridge, by the Rev. J. C. Atkinson (Zool. 5977), and I quite agree in his opinions with respect to the mountain partridge, so called, and the suppression of scent theory, both of which have their advocates in the 'Field' newspaper. I live in much the same country described by that gentleman, and equally wild; and I shoot partridges occasionally, on opening the crops of which nothing is found but the tops of heather, the same as is found in the crops of grouse; and where I kill them, the birds possibly, and probably, have never tasted corn of any kind, but there is no difference of plumage that I can detect, though naturally, from the food, they are a smaller bird. The only thing in which I would differ from the Rev. J. C. Atkinson is in the partridge not often nesting on heathery and waste land: I think they do with us considerably, but I have not sufficiently remarked on this habit. It would not be so difficult for the old partridge to convey her active little brood to cultivated ground, as for the wild duck, with her splayfooted offspring; and with us both duck and teal invariably nest out on the moor, or waste land, and I have known the nests quite half a mile from water, generally on high dry hills, covered with thick heather. There is another *vexata quæstio* in the 'Field,' which is being discussed at the present time,—whether the male partridge assists in incubation. I should much wish to have the opinion of so good an observer as Mr. Atkinson on this point. I have seen the two old birds squeezed together upon the nest, but the young birds were just hatched out, and ran that same day. Whether the male bird sits on the eggs, in turn with the hen bird, I have not had an opportunity of verifying.—*John Spicer; Fowley, Hants, March* 13, 1858.

Occurrence of Rare Birds near Barnstaple.—Singular to relate, although the commencement of the past winter was with us what may be termed unusually mild, birds, which are rare visitants here even when the weather is more than ordinarily severe, have appeared on our river in some numbers. I refer especially to members of the family Colymbidæ. What seemed to be a small flock of Colymbus glacialis frequented

the river throughout the greater part of December; and at high water, on more than one occasion, good sport was had by parties in boats, in chasing one of these divers, and they generally had to make a good pull for it, and to expend a considerable quantity of cartridges before a specimen was hauled dead into the boat. All the birds which were shot were in an immature state of plumage. C. septentrionalis has also been shot this winter, as well as a beautiful specimen of Podiceps cornutus: this grebe is obtained on our river with some regularity nearly every winter. One day, in the early part of January, I saw a fine specimen of Lanius excubitor, but did not get very near to it: I watched it fly some distance down the valley, its gray and white plumage making it visible at a considerable distance: its flight is in a straight line, with regular dips, closely resembling that of Turdus viscivorus. I also observed a specimen of Emberiza nivalis on a marsh close to the town, a far from common winter visitant with us: the bird in question I saw frequenting the same spot for more than three weeks; his favourite haunt was a turnip field bordering on the marsh, where he associated amicably with a flock of skylarks, always leaving them on the approach of any one, and often settling on the top of a tall tree in the hedge-row, where, when the sun was shining brightly, he glistened as if a small ball of the purest snow were attached to the topmost branch.—*Murray A. Mathews; Raleigh, near Barnstaple, March* 15, 1858.

The Sea-Serpent.—To one who firmly believes in the existence of some huge marine monster of the serpent form, such as the Northmen love to descant upon (and I am not ashamed to own to such credulity, as I have already declared in my Notes on Norway, Zool. 3229), the clear and minute account of Capt. Harrington, of the sea monster which he and twenty people saw on the 12th of December last, off the coast of St. Helena, was exceedingly interesting; nor did the subsequent letter of Mr. F. Smith tend to shake my belief in the accuracy of Capt. Harrington's statement, the particulars of the two alleged appearances being so very different. I am not, however, about to argue the point, the premises before us being far too unsatisfactory and vague to argue from. I merely write to express my hope that as you have admitted the first correspondence on the subject to the pages of the 'Zoologist,' you will give both parties fair play, and insert the remaining letters, which appeared in the 'Times' of February 16th and 23rd respectively, copies of which I enclose, so that naturalists may have an opportunity of studying the case in all its bearings, before they form their conclusions.—*Alfred Charles Smith; Yatesbury Rectory, Calne, March* 5, 1858.

From the 'Times' of February 16th.

"Sir,—Observing in your paper of yesterday's date a letter from a correspondent relative to the marine animal commonly called the 'sea-serpent,' in the concluding paragraph of which he mentions that he has no doubt the object seen from Her Majesty's ship 'Dædalus,' in the month of August, 1848, when on the passage from the Cape of Good Hope to St. Helena, was a piece of the same seaweed observed by himself, I beg to state that the object seen from Her Majesty's ship on that occasion was, beyond all question, a living animal, moving rapidly through the water against a cross sea, and within five points of a fresh breeze, with such velocity that the water

was surging under its chest as it passed along at a rate, probably, of not less than ten miles per hour. Capt. M'Quhae's first impulse was to tack in pursuit, ourselves being on a wind on the larboard tack, when he reflected that we neither could lay up for it or overhaul it in speed. There was nothing to be done, therefore, but to observe it as accurately as we could with our glasses as it came up under our lee quarter and passed away to windward, at its nearest position being not more than 200 yards from us; the eye, the mouth, the nostril, the colour and form, all being most distinctly visible to us. We all felt greatly astonished at what we saw, though there were sailors among us of thirty and forty years' standing, who had traversed most seas and seen many marvels in their day. The captain was the first to exclaim, 'This must be that animal called the sea-serpent,' a conclusion which, after sundry guesses, we all at last settled down to. My impression was that it was rather of a lizard than serpentine character, as its movement was steady and uniform, as if propelled by fins, not by any undulatory power. It was in sight from our first observing it about ten minutes, as we were fast leaving one another on opposite tacks with a freshening breeze and the sea getting up.

"I feel, Sir, I have already occupied more of your time and space than is justifiable, and have the honour to remain your obedient servant,

"An Officer of Her Majesty's Ship 'Dædalus.'

"February 13."

"Sir,—A letter appears in the 'Times' of to-day signed 'Frederick Smith' on the subject of the sea-serpent.

"The writer has this advantage over others who have reported the occasional appearance of what he fairly calls 'this queer fish'—that he has handled as well as seen it. Still there would seem to be a considerable variety in the genus, for, while the specimen obtained by the 'Pekin' in 1848 was 4 inches in diameter and 20 feet in length, that seen from the 'Circassian' is described, if I remember rightly, in your paper of the 4th inst., as 10 feet or 11 feet in diameter, and upwards of 200 feet in length.

"In this latter instance it was seeing only, and but a passing sight; and testimony of this kind is just that which naturalists may be slow to receive as evidence of any new fact; nevertheless the practised vision of the Circassian's commander should go for something, and, as it would appear from the following letter that Capt. Harrington is to be in town next week and ready to answer any questions, it might be worth the while of some of our philosophers to examine a little into the question of what Capt. Harrington and his officers really did see.

"I have the honour to be, Sir, your most obedient servant,

"W. A. B. Hamilton.

"Blackheath, February 12."

"14, South Castle Street, Liverpool, February 8.

"Dear Sir,—I am in receipt of your favour of the 6th of February, and should be glad if my communication to the 'Times' might be instrumental in dispelling many doubts respecting the existence of such a monster as that described by myself and officers.

"I communicated it to Capt. Schomberg, R.N., of this place, in the course of conversation, who advised me by all means to send a copy of it to the 'Times.'

"Notwithstanding the assertions of men of science to the contrary I am now sure that such animals exist. I could no more be deceived than (as a seaman) I could mistake a porpoise for a whale. If it had been at a great distance it would have been different; but it was not above 20 yards from the ship.

"I am of opinion that this animal makes its appearance at the surface at long intervals only. I am informed by Messrs. Lamport and Holt, shipowners of this place, that one of their captains reported a similar thing about two years ago, off the Island of St. Helena; but they took no further notice of it, supposing, as your friends seem to do, that he might have been deceived.

"Twenty people, including Mrs. Harrington and my two officers, saw it as distinctly as I now see the gas light which I am writing by. I am well known in London, having commanded a steam transport during the Russian war belonging to the North of Europe Steam Navigation Company.

"Capt. Claxton, R.N., of the Priory, Battersea, is a personal friend of mine. I am also well known to Sir Colin Campbell, who is now in the East. My present ship is 1064 tons new measurement, and a new ship, of which I own a good part myself. There are, therefore, many reasons (in addition to my holding a first-class certificate in the mercantile marine) to hinder me from propagating a report which can do me no good, and, if untrue, do injury to science in the room of assisting it to elicit the truth in so important a matter as the discovery of the inhabitants of the deep.

"I shall be in town for three or four days in the early part of next week. A letter addressed to me at the Jerusalem Coffee-house will meet with attention, and, if my limited time permit, I should be glad to have an interview with yourself, or any of your friends who might wish to have a verbal explanation in this matter.

"I have the honour to remain, Sir, your obedient servant,

"G. H. Harrington.

"To Rear-Admiral W. A. B. Hamilton."

From the 'Times of February 23rd.

"Sir,—I beg to explain, in answer to Rear-Admiral Hamilton, that in the water, before being divested of its extraordinary-looking living appendages, the diameter of my marine capture was above three feet. Some buckets full of splendidly-coloured blue and crimson crabs, varying from the size of a shilling to that of a man's hand, were collected from it; and that this quantity of such animal life could be furnished with a refuge in the mats of snaky-looking creatures which constituted the moving monstrous-looking external will assist those who read my account in believing what I before stated, that even when the object was laid on deck we had difficulty in making out what it was. Now, sea-weeds of gigantic growth abound near the islands of the group of Tristan d'Acunha. From decay or other causes, these will from time to time become detached at the roots, and with their living attachments will then, floating horizontally, be carried by the well-known currents into the very positions where the sea-serpent delights in exhibiting himself. It is not disputed that such was the monster picked up by the boat's crew of my ship. I do not doubt that more monstrous specimens may be seen from time to time, and I expect that your insertion of this correspondence will cause more attention to be given to their capture than, as on board of Her Majesty's ship 'Dædalus,' to the forming of sundry 'guesses,' causing

the observers to 'settle down' to the conclusion, 'This must be the animal called the sea-serpent.' Had the monster I described not been taken, I should have believed, as firmly as Capt. Harrington does, that I could confirm the statement of the commander of the 'Dædalus,' and that 'the animal belonged to the serpent tribe.'

"Everybody knows what different notions are generated by momentary and unexpected appearances of things as compared with the things themselves when examined. Perhaps the nostril of the 'Dædalus' sea-serpent was seen in the recollection of one spectator, the mouth in that of another, the eye in that of another, and so on. I take leave to question the possibility of these 'being most distinctly visible' when the object at its 'nearest position' was 200 yards distant, the sea getting up, and the observers travelling in an opposite direction, the passing of the two being apparently at the rate of twenty miles an hour. Naturalists will say whether an animal to answer to the habits and attributes of that in question would have a nostril.

"I am sure that Capt. Harrington, of the 'Castilian,' saw an extraordinary object, and described it according to his impression, and having a great respect for 'a first-class certificate in the mercantile marine' (as I hold a 'first-class extra' myself), and also for 'Sir Colin Campbell, now in the East,' to whom Capt. Harrington is so well known, I feel equally sure that, so accredited, he has published his account with no other than a good object. Nevertheless, these circumstances do not prove to me that Capt. Harrington saw the sea-serpent, because that 'queer fish' so very nearly and completely took me in until I took him in.

"I am, Sir, your most obedient servant,

"Fred. Smith.

"Newcastle-on-Tyne, February 19."

On the Geographical Distribution of Butterflies in Great Britain.

By T. Boyd and A. G. More, Esqrs.

The present paper originated in a desire to ascertain how far the plan of Mr. H. C. Watson's 'Cybele Britannica' is available in the sister science of Zoology, and for our experiment we have selected the butterflies as the best known and most generally studied of British insects. It is now offered to entomologists as a sketch which future observation may fill up,—as something to which the youngest, if only he be accurate, may make useful additions, and so aid in forming a list which shall be valuable in a scientific point of view.

Any one at all acquainted with Entomology, its present immature condition, its peculiar liability to error, and the state of feeling among collectors, will easily perceive that nothing beyond a bare sketch of the distribution of any family of insects is at present possible. We are aware that the accompanying list might have been made much more complete had a wider range of authorities been taken; but

knowing how much doubt attaches to many names occurring in the best works, and the amount of inaccuracy to be found in many local lists, it appeared to us that more would be lost in value than gained in completeness by quoting authorities indiscriminately: we have therefore confined ourselves to one recent work, which we believe to be compiled with great care, *viz.* Stainton's 'Manual of British Butterflies,' and for the rest we have relied upon the authority of the following entomologists, to whom our best thanks are due, and whose names will be a sufficient gurantee for the accuracy of their information:—Messrs. Allis, Ashworth (since deceased), Bond, Buxton, Doubleday, Edleston, Harris, Logan, Salt, and Vaughan. Two or three localities are also added on the authority of McGillivray's 'Natural History of Dee-Side.'

The names adopted are those of Doubleday's 'Synonymic List,' which we believe are at the present time most generally used in this country. The particulars of the "Provinces," into which Mr. Watson has divided Great Britain, are enumerated below:—

1. Peninsula: Cornwall, Devon, Somerset.
2. Channel: Dorset, Wilts, Isle of Wight, Hants, Sussex.
3. Thames: Kent, Surrey, Berks, Oxford, Bucks, Middlesex, Herts, Essex.
4. Ouse: Suffolk, Norfolk, Cambridge, Bedford, Huntingdon, Northampton.
5. Severn: Gloucester, Worcester, Warwick, Stafford, Salop, Hereford, Monmouth.
6. South Wales: Glamorgan, Caermarthen, Pembroke, Cardigan, Brecon, Radnor.
7. North Wales: Montgomery, Merioneth, Caernarvon, Denbigh, Flint, Anglesea.
8. Trent: Leicester, Rutland, Lincoln, Notts, Derby.
9. Mersey: Cheshire, Lancashire.
10. Humber: York.
11. Tyne: Durham, Northumberland.
12. Lakes: Westmoreland, Cumberland (Isle of Man).
13. West Lowlands: Dumfries, Kirkcudbright, Wigton, Ayr, Lanark, Renfrew.
14. East Lowlands: Berwick, Roxburgh, Peebles, Selkirk, Haddington, Edinburgh, Linlithgow.
15. East Highlands: Fife, Kinross, Clackmannan, Stirling, Perth, Forfar, Kincardine, Aberdeen, Banff, Moray (including Nairn, Elgin, and the North-east of Inverness).

16. West Highlands: Dumbarton, Argyle, Inverness, westward of Loch Erricht, Isles adjacent, from Arran to Skye.
17. North Highlands: Ross, Cromarty, Sutherland and Caithness.
18. North Isles: Hebrides, Orkney, Shetland.

It is with these provinces alone that the present paper has to do, and no attempt has been made to work out an estimate of the counties, or the latitude or altitude, to which the various species are confined, there being at present no sufficient materials for the purpose.

Papilio Machaon. Area * 2 * 4. Marshes, local. A handsome insect, frequently bred in numbers, and therefore occasionally taken on the wing in various localities.

Pieris Cratægi. Area 1 2 3 4 5. Woods and forests, local.

P. Brassicæ. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16. This and the two following species seem attached to cultivated land, and are probably common everywhere. Mr. Buxton says that he saw white butterflies in Sutherland (17), but did not notice the species.

P. Rapæ. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16.

P. Napi. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16.

P. Daplidice. Area * * 3 4 5. *Stainton's Manual.*

Anthocharis Cardamines. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 * 16.

Leucophasia Sinapis. Area 1 2 3 4 5 * * 8 * 10 * 12. Woods and forests.

Gonepteryx Rhamni. Area 1 2 3 4 5 * * 8 9 10 11 12. Woods and cultivated land.

Colias Edusa. Area 1 2 3 4 5 * * 8 9 10 11 12 * * * 16. Cultivated land and downs. This and the next species are most plentiful near the coast.

C. Hyale. Area 1 2 3 4 5 * * 8 9 10. Cultivated land and downs.

Thecla Betulæ. Area 1 2 3 4 5 * * 8. Woods.

T. Pruni. Area * * * 4. Woods, local.

T. W-album. Area 1 * 3 4 5 * * * * 10. Hedge-row elms.

T. Quercus. Area 1 2 3 4 5 * 7 8 9 10 * 12 * * * 16. Woods.

T. Rubi. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 * 15 16 17.

Chrysophanus dispar. Area * * * 4. Marshes, local; apparently extinct.

C. Phlæas. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16.

Polyommatus Argiolus. Area 1 2 3 4 5 * 7 * 9 10 * 12. Woods.

P. Alsus. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 14 15 16. Downs.

P. Acis. Area * 2 * 4 5. Cultivated ground, local. 2, 4, *F. Bond.* 5, *Stainton's Manual.*

P. Ægon. Area 1 2 3 4 5 * * * 9 10. Uncultivated ground.

P. Alexis. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 * * 18.

P. Adonis. Area 1 2 3 * 5. Downs, on chalk.

P. Corydon. Area 1 2 3 4 5 * * 8. Downs, on chalk.

P. Arion. Area 1 * * 4. Local.

P. Agestis. Area 1 2 3 4 5 * 7 * * 10.

P. Artaxerxes. Area * * * * * * * * * 10 11 * 13 14 15. The area of this insect begins where that of Agestis ends: is it a species?

Nemeobius Lucina. Area * 2 3 4 5 * * 8 * 10 * 12 13. Woods, local.

Limenitis Sybilla. Area * 2 3 4 5. Woods and forests.

Argynnis Paphia. Area 1 2 3 4 5 * 7 8 * 10 11 12. Woods.

A. Aglaia. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 * 15 16. Woods.

A. Adippe. Area 1 2 3 4 5 * * 8 * 10 * 12 * * * 16. Woods.

A. Lathonia. Area 1 2 3 4 5. Cultivated land, local. (*Stainton's Manual*). Other species have frequently been mistaken for this, and it probably often escapes notice from its similarity to them.

A. Euphrosyne. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 * 15 16 17. Woods.

A. Selene. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 14 15 16 17. Woods.

Melitæa Artemis. Area 1 2 3 4 5 * * 8 9 10 * 12 13 14 * 16. Marshes, local.

M. Cinxia. Area * 2 3 4 * * * * * * * * * * 15. Uncultivated land, local.

M. Athalia. Area 1 * 3 4 5. Woods, local.

Vanessa Cardui. Area 1 2 3 4 5 * * 8 9 10 * 12 13 14 15 16. The whole of this genus seems to prefer cultivated land.

V. Atalanta. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 14 15 16.

V. Io. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 14 15 16.

V. Antiopa. Area 1 2 3 4 5 * * 8 9 10 * 12 * 14.

V. Urticæ. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16 17.

V. Polychloros. Area 1 2 3 4 5 * * 8 9 10 * 12.

V. C-album. Area 1 2 3 4 5 * 7 8 9 10 11 12. Local, not found in places where it was once common.

Apatura Iris. Area * 2 3 4 5 * * 8. Woods.

Arge Galathea. Area 1 2 3 4 5 * * 8 * 10. Waste ground, local.

Erebia Cassiope. Area * * * * * * * * * * * 12 * * 15. Mountains, local.

E. Blandina. Area * * * * * * * * 9 10 11 12 13 14 15 16. Waste ground, local.

Satyrus Semele. Area 1 2 3 4 5 * 7 * 9 10 11 12 13 14 15 16. Waste ground, local.

S. Janira. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16.

S. Tithonus. Area 1 2 3 4 5 * 7 8 9 10 * 12.

S. Megæra. 1 2 3 4 5 * 7 8 9 10 * 12 13.

S. Ægeria. Area 1 2 3 4 5 * 7 8 9 10 * 12 * 14 * 16. Woods.

S. Hyperanthus. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 14 15 16. Damp woods.

S. Davus. Area * * * * 5 * * * 9 10 * 12 * 14 15 16 17 18. Local.

S. Pamphilus. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16.

Steropes Paniscus. Area * * * 4 * * * 8. Woods, local.

Pamphila Linea. Area 1 2 3 4 5 * * 8 * 10 * * * 14.

P. Sylvanus. Area 1 2 3 4 5 * 7 8 9 10 * 12 13 14.

P. Comma. Area 1 2 3 4 * * * * * 10. Downs, local. In Stainton's 'Manual' Scarborough is given as a locality for this insect, but Mr. Allis says that he has frequently examined specimens, said to be common, taken in Yorkshire, but they invariably proved to be Sylvanus.

P. Actæon. Area 1 2 * * 5. 5, *Stainton's Manual.* Local.

Syrichthus Alveolus. Area 1 2 3 4 5 * * 8 * 10 * * 13 * * * 17.

Thanaos Tages. Area 1 2 3 4 5 * 7 8 9 10 11 12 13 * * 16 17.

(*Chrysophanus Chryseis.* Area * 2 3. *Stainton's Manual*).

Having thus applied Mr. H. C. Watson's formula, as far as "Provinces" are concerned, we will next endeavour to carry out the system of the 'Cybele Britannica' a little further, by referring the several insects to their respective "Types of Distribution," premising that, with increased observation, a few changes may become necessary, and we may then hope to see Mr. Watson's plans carried out, for the butterflies at least, into some of the other details, which he has successfully employed for our flowering plants.

I. Twenty-three species are assigned to the "British Type," as they appear to be widely distributed throughout Great Britain, though their range is scarcely so universal as that of the plants which belong

to the same section. They represent our commonest butterflies, and all occur in Scotland, many of them reaching as far as its northern extremity: three, however (Argynnis Euphrosyne and Selene, and Syrichthus Alveolus), are not enumerated in a list of Irish butterflies with which we have lately been favoured by a correspondent.

The members of the "British Type" are —

Pieris Brassicæ
„ Rapæ
„ Napi
Anthocharis Cardamines
Thecla Rubi
Lycæna Phlæas
Polyommatus Alsus
„ Alexis
Argynnis Aglaia
„ Euphrosyne
„ Selene
Melitæa Artemis
Vanessa Cardui
„ Io
„ Atalanta
„ Urticæ
Satyrus Semele
„ Janira
„ Ægeria
„ Hyperanthus
„ Pamphilus
Thanaos Tages
Syrichthus Alveolus.

A few of these are local: Melitæa Artemis and Syrichthus Alveolus affect marshy situations; Polyommatus Alsus, Satyrus Semele and Thanaos Tages seem attached to a dry or calcareous soil; Argynnis Aglaia, A. Selene and Thecla Rubi can hardly be called common.

Small as this list is already, it is believed that by strictly following Mr. Watson's definition several of its species might be transferred to the next group.

II. The "English Type" comprises twenty-four species, all of which are more abundant in the Southern "Provinces," decreasing in frequency northwards.

Thecla W-album (E.)
Polyommatus Acis (E.)
„ Arion (E.)
Melitæa Athalia (E.)
Vanessa Antiopa (E.)
„ Polychloros (E.)
„ C-album (E.)
Polyommatus Agestis (E.)
Nemeobius Lucina (E.)
Argynnis Adippe (E. S.)
Pieris Cratægi (E. I.)
Colias Hyale (E. I.)
Thecla Betulæ (E. I.)
Leucophasia Sinapis (E. I.)
Gonepteryx Rhamni (E. I.)
Polyommatus Argiolus (E. I.)
„ Ægon (E. I.)
Argynnis Paphia (E. I.)
Satyrus Tithonus (E. I.)
Colias Edusa (E. S. I.)
Thecla Quercus (E. S. I.)
Satyrus Megæra (E. S. I.)
Pamphila Sylvanus (E. S. I.)
„ Linea (E. S. I.)

The four first, though very local, seem to have their proper place here, and not in the "Germanic Type," as they do not evince a sufficient preference for the Eastern side of England: they, with the next six, are said to be absent from Ireland.* Six—Colias Edusa, Pamphila Sylvanus and Linea, Thecla Quercus, Satyrus Megæra and Argynnis Adippe—reach Scotland, but only its southern portion. One, A. Adippe, is found in Scotland, though wanting in Ireland.

The ascertained range of S. Megæra does not yet warrant its being transferred to the "British Type."

III. In proceeding to illustrate the third group, or "Germanic Type," comprising the South-eastern species, it is necessary to notice the difficulty of drawing a line between it and the former (or "English"). For instance, Pieris Cratægi and Thecla Betulæ might, but for their occurrence in Ireland, be referred to the "Germanic," while Argynnis Lathonia and Pieris Daplidice approach the "English." Thirteen species belong to the "Germanic Type," its more local members being

Lycæna dispar
Thecla Pruni
Papilio Machaon
Melitæa Cinxia
Steropes Paniscus

And those with a wider range, still however preserving the same greater frequency on the East side and towards the South-east corner of England,

Pieris Daplidice
Argynnis Lathonia
Limenitis Sibylla
Apatura Iris
Polyommatus Adonis
„ Corydon
Pamphila Comma
Arge Galathea.

None of these thirteen have been found in either Scotland or Ireland.

IV. The "Atlantic" or South-western Type has but one representative, *viz.*

Pamphila Actæon.

It is wanting in Ireland.

* Polyommatus Agestis and Nemeobius Lucina have, with Polyommatus Corydon and Melitæa Athalia, been recorded as Irish, but there is no recent authority for their occurrence.

V. The "Scottish" or Northern Type contains three species,—

Polyommatus Artaxerxes — Erebia Blandina.
Satyrus Davus

VI. The "Highland" or Mountain Type one only,

Erebia Cassiope.

It is remarkable that, of the last four, two only—Satyrus Davus and Erebia Cassiope—reach Ireland, whereas all of them occur in England.* When surprise is expressed at the poverty of our mountain Fauna, it should be remembered that it is analogous to that of the Scandinavian, not the European, Alps.

If we proceed to institute a comparison between our butterflies and flowering plants, as to the respective proportions of the several "Types," we shall find there are—

	Among Butterflies.	In Flowering Plants, according to Mr. Watson's Estimate.	Proportion.
British Type (23).....	2-5ths or nearly 2-5ths...	2-5ths.....	The same.
English Type (24) ...	2-5ths nearly.....	1-5th	Double.
Germanic Type (13)...	1-5th	1-15th to 1-20th...	Thrice as many.
Atlantic Type (1).....	1-65th	1-15th to 1-20th...	One-fourth.
Scottish Type (3).....	1-20th	1-20th	The same.
Highland Type (1) ...	1-65th	1-15th	One-fourth.

So that the greatest contrast is presented by the striking preponderance of the "Germanic" and "English" Types among the insects: on the other hand the "Atlantic" element (which in plants nearly balances the "Germanic") is in the butterflies quite insignificant, and the "Highland" is equally small.

The same thing becomes still more evident on adding together the "Germanic" and "English" sections, as they amount to more than one-half of the whole number against a quarter in plants: from which it seems reasonable to conclude that our butterflies are much more unequally and locally distributed than our flowering plants. That the insects are also much more influenced by a warmer temperature is plain, both from the higher numbers of southern species and

* Supposing the English P. Salmacis to be a mere variety of P. Artaxerxes.

because Ireland has more than twice as many of them as Scotland.* It is believed this will be still further confirmed by a comparison drawn between Great Britain and any central portion of the European Continent.

The readers of Forbes's Essay will find, in the relative numbers of Highland and Lowland species, nothing but what agrees with the hypothesis that our alpine Fauna is the more ancient, and has descended to us from a period when the summits of our mountains existed as islands, or members of a chain of islands, communicating with Scandinavia across the "Glacial Sea." In such a case we should expect to find the alpine species few in number, since their area was restricted from the first and its climate boreal: the insects, too, may have been less able than contemporary plants to survive the changes of temperature and the accidents of geological disturbances. On the other hand, the higher numbers of the "British," "English" and "Germanic" Types point to a more recent derivation from the adjoining Continent.

The disproportion, however, among butterflies, between the "Atlantic" and "Germanic" Types, is worthy of attention, in so far as these two nearly agree with Forbes's "Norman" and "North-French" Floras, both of which he supposed (with some reservations) to be still older than the "Scandinavian" or "Highland." Now the high numbers of the "Germanic" Type, the difficulty of separating it satisfactorily from the "English," together with the fact of its plants being found (some of them abundantly) in the centre of Germany, lead to the conclusion that it is but a branch of and contemporaneous with the central European, Forbes's "Great Germanic" Flora.

Looking, on the contrary, at the "Atlantic" Type, with its fewness of insect species, at the more clearly southern character of its Flora (which in great measure consists of plants found towards the Atlantic and Mediterranean coasts, and absent from Germany), and at its being

* The Irish species are thirty-six:—

British Type.....	20
English Type	14
Scottish Type	1
Highland Type.....	1

The Scotch species are thirty-three:—

British Type.....	23
English Type	6
Scottish Type	3
Highland Type.....	1

Not one is found in either Scotland or Ireland that does not also occur in England. That Ireland, with fewer plants than Scotland, should have more butterflies, shows that the number of the latter is less influenced by western position than might have been expected.

on our shores further isolated from its original abode, we cannot help inclining to the belief that it presents a distinctness of feature which the "Germanic" does not, and approaches closely in character, perhaps also in age, to the Flora of the West of Ireland, which is said to be the most ancient of all that still exist in Great Britain.

In conclusion, we would venture to recommend Mr. Watson's system to the consideration of those who are engaged in the study of other branches of British Natural History: we have no doubt that it might be applied, with most interesting results, to the land mollusks and other *stationary* members of our Fauna; and the advantages of conforming to a plan already in use it is needless to enlarge upon.

Much, however, remains to be done before the "Cybele" of even our butterflies can be considered complete: we can only hope that a point has been attained upon which future observation may be brought to bear.

T. Boyd.
A. G. More.

British Geometrina, as arranged and named in M. Guenée's Second Volume of the Geometræ of the whole world.—

Timandra
Amataria
Cabera
Pusaria
Rotundaria
Exanthemaria
Corycia
Temerata
Taminata
Aleucis
Pictaria
Macaria
Alternata
Notata
Liturata
Halia
Wavaria
Strenia
Clathrata
Panagra
Petraria
Numeria
Pulveraria
Scodiona
Belgiaria
Favillacearia, D. L.
Selidosema
Plumaria
Fidonia
Carbonaria
Atomaria
Piniaria
Pinetaria
Quinquaria, D. L.
Conspicuata
Minoa
Euphorbiata
Scoria
Dealbata
Sterrha
Sacraria
Aspilates
Strigillaria
Citraria
Gilvaria
Abraxas
Grossulariata
Ulmata
Ligdia
Adustata
Lomaspilis
Marginata
Pachycnemia
Hippocastanaria
Hybernia
Rupicapraria
Leucophearia
Aurantiaria
Defoliaria
Progemmaria
Anisopteryx
Æscularia

CHEIMATOBIA
Brumata
Boreata
OPORABIA
Dilutata
Filigrammaria
Autumnaria, D. L., non *Boisd.*, var. præc. teste *Gn.*
LARENTIA
Didymata
Multistrigaria
Cæsiata
Ruficinctata
Flavicinctata, Steph., D. L.
Salicata
Olivata
Pectinitaria
EMMELESIA
Affinitata
Rivulata, D. L.
Alchemillata
Hydraria, D. L.
Albulata
Decolorata
Tæniata
Unifasciata
Bifasciata, D. L., var. præc. teste *Gn.*
Ericetata
Blandiata
EUPITHECIA
Venosata
Consignata
Linariata
Pulchellata
Centaureata
Succenturiata
Subfulvata, D. L., var.
Cognata, D. L., var.
Subumbrata
Pernotata
Plumbeolata
Haworthiata, *Doub.*, n. s.
Pygmæata
Helveticaria
Satyrata
EUPITHECIA
Egenaria
Castigata
Pimpinellata
Pusillata
Irriguata
Denotata
Innotata
Indigata
Constrictata
Nanata
Subnotata
Vulgata
Expallidata
Absynthiata
Minutata
Assimilata
Tenuiata
Subciliata
Dodoneata
Abbreviata
Exiguata
Sobrinata
Togata
Pumilata
Coronata
Rectangulata
Debiliata
COLLIX
Sparsata
LOBOPHORA
Sexalata
Hexapterata
Viretata
Lobulata
Polycommata
THERA
Juniperata
Simulata
Variata
Firmata
YPSIPETES
Ruberata
Literata, Don ? Gn.
Impluviata
Elutata
MELANTHIA
Rubiginata
MELANTHIA
Ocellata
Albicillata
MELANIPPE
Hastata
Tristata
Procellata
Unangulata
Amnicularia, D. L.
Rivata
Alchemillaria, D. L., var. præc. teste *Gn.*
Montanata
Galiata
Fluctuata
ANTICLEA
Sinuata
Rubidata
Badiata
Derivata
Berberata
COREMIA
Munitata
Propugnata
Ferrugata
Unidentaria, D. L., var. præc. teste *Gn.*
Quadrifasciaria
CAMPTOGRAMMA
Bilineata
Fluviata
Gemmata
PHIBALAPTERYX
Tersata
Lapidata
Lignata
Polygrammata
Vitalbata
SCOTOSIA
Dubitata
Vetulata
Rhamnata
Certata
Undulata
CIDARIA
Psittacata
Miata

CIDARIA
- Picata
- Corylata
- *Ruptata*, D. L.
- Sagittata
- Russata
- *Immanata*, D. L., var. præc. teste *Gn.*
- Suffumata
- Silaceata
- Prunata
- Testata
- *Achatinata*, D. L.
- Populata

CIDARIA
- Fulvata
- Pyraliata
- Dotata
- *Marmorata*, D. L.

PELURGA
- Comitata
- *Chenopodiata*, D. L.

EUBOLIA
- Cervinaria
- Mensuraria
- Palumbaria
- Bipunctaria
- Lineolata

CARSIA
- Imbutata

ANAITIS
- Plagiata
- Præformata ?

LITHOSTEGE
- Nivearia

CHESIAS
- Spartiata
- Obliquaria

TANAGRA
- Chærophyllata.

—*Communicated by Henry Doubleday, Esq.* [The names added in *Italics* are either those used in Mr. Doubleday's 'List' for the same species, or are supposed by M. Guenée to be varieties of the species the name of which precedes each in Roman characters.]

Tephrosia laricaria.—I have now by me the pupæ of laricaria, which I hope shortly to see in their last stage. The larvæ, which I beat from the larch while in Lancashire last August, are so varied in colour that it would not be possible to give an accurate description of them unless they were before me. Having also taken and bred the larva of crepuscularia (which feeds upon the oak), I state as my firm belief that laricaria is not a variety of it. I have taken crepuscularia in the greatest abundance, both in this neighbourhood and elsewhere in the Midland Counties, but never took a single laricaria nor one intermediate variety.—*Henry Burney; Wavendon Rectory, February* 20, 1858.—*From the 'Intelligencer.'*

Gnophos obscuraria.—With regard to obscuraria, as far as my experience goes, I should decidedly incline to the opinion that it is a distinct species, and not a variety of pullaria. About eighteen years ago, when mothing on Parley Heath, in Hampshire, in company with Mr. Dale, we found the former insect in the most wonderful profusion that can be conceived. They were at rest in the dry mounds of cut turf or peat, on brushing the sides of which with the net they flew out in the most distracting abundance. I caught a great number, all of which were exactly alike,—no intermediates between that and pullaria. Indeed, I have generally considered obscuraria to be a heath insect. Pullaria I have usually met with in stone quarries and chalk pits. Near Bath it is not at all uncommon in the large free-stone quarries, and among the Bath Hampton Rocks, also in Portland, and is quite common in the chalk pits on the South Downs near Lewes and Brighton. Neither occur in this part of England. —*Id.*

Gnophos pullaria.—The larva of this species hybernates about half fed; it begins to feed again in April. I found two some years since near Matlock; they fed up upon the salad burnet (*Poterium sanguisorba*, L.), and from one of them I bred the perfect insect. They closely resembled Hübner's figure of the larva of G. obscuraria. I found them by pulling up the grass and low-growing plants by the roots. The larva conceals itself by day. There was a great deal of Helianthemum vulgare inter-

mingled with the Poterium sanguisorba in the locality where I found them.—*H. Harpur Crewe; Stowmarket, February* 20, 1858.—*Id.*

Larva of Harpalyce sagittaria.—Seeing by the 'Intelligencer' that the larva of H. sagittaria appears to be unknown, I beg to send you the following description with particulars:—Larva pale drab, with several fine and distinct lines of a dark drab colour running parallel down the sides; a chain of rhombus-shaped markings of the same colour down the centre of the back, one on each segment, with a central spot in each also dark drab. In July, 1855, I captured a female, which laid nearly thirty eggs; they hatched in about ten days. I fed the larvæ upon arrow-head (*Sagittaria*); they seemed to prefer the flowers, but they ate sparingly and grew very slowly, as by the end of September they appeared only three parts grown; their number had also diminished to about eight or nine. I then gave them to Mr. Bond, who kept them alive till October, but they afterwards died. From my failure to rear them I conclude either that the larva hybernates or that Sagittaria is not their proper food. —*Thomas Brown;* 13, *King's Parade, Cambridge, March* 5, 1858.—*Id.*

Flavicinctaria and Cæsiaria.—In M. Guenée's work on Geometræ, I understand he unites two species, and makes them varieties of one and the same; I allude to flavicinctaria and cæsiaria. I believe I can prove that these species are distinct: when in Scotland, last summer, I took and examined fully 1000 specimens of cæsiaria, and in no instance could I find any of that beautiful deep yellow, which is one of the most striking colours in flavicinctaria. In the month of July I took some larvæ feeding on the common heath: they were new to me; they were of a dark colour, with some purple angular markings on the back: in August these produced cæsiaria. This insect swarms on all the mountains in Perthshire, and is equally abundant in the valleys and on the mountain tops: wherever there is heath there is cæsiaria. After this species has been out about three weeks, if you go up the burns or mountain water-courses, but at some elevation, you will find flavicinctaria just out. Of course, as cæsiaria is everywhere, you will see them along with flavicinctaria, but you will not find the latter species at any distance from the water-courses, as the larva feeds on Saxifrage, which only grows in the burns. Another instance of the specific distinctness of the insects is that, though they are both found at rest on the faces of rocks, cæsiaria is excessively restless, and flies off before you can get to them to box them, but all the flavicinctaria are left behind.—*H. J. Harding;* 1, *York Street, Church Street, Shoreditch, March* 8, 1858. [M. Guenée, in his Errata and Addenda, admits that our flavicinctata must be considered distinct, but doubts whether it be the Continental species known by that name. However, Freyer, who treats of the larva of the Continental flavicinctata, says it feeds on Saxifraga petræa; the larva he figures as dull green, with a row of reddish white dorsal triangles.]—*Id.*

Undescribed Geometræ Larvæ.—I have repeatedly bred Cabera rotundaria from the larva, which feeds on birch: it is very similar to the larva of pusaria, but, I think, is rather thicker towards the abdomen, and I believe does not vary from pale green to quite brown, as the latter does: the larva of rotundaria is pale green. I bred a specimen of Bapta temeraria from a beautiful bright green larva, with a red head and marked with red on each segment: it was beat from a wild cherry tree at Joydon Wood, in September, and the insect appeared last June. The larva of Cheimatobia borearia is not uncommon at West Wickham, in June, on

birch: this larva is very similar to that of brumaria, but more transparent and the lines less distinct; it has a brown head, thus differing from the larva of brumaria, the head of which is always green. I have bred several specimens of Ypsipetes ruberaria from larvæ obtained on Wimbledon Common in September; they fed in curled-up leaves of sallow: it is a dirty white or grayish larva, and is slightly hairy. Of Phæsyle miaria I have bred several specimens from larvæ obtained from oak and birch, in Headley Lane, in the middle of August: it is a long slender green larva, with two forks projecting beyond the abdomen.—*W. Machin;* 35, *William St., Globe Fields, Mile End, March* 9, 1858.—*Id.*

Undescribed Geometra Larvæ.—I bred a specimen of C. miata this autumn from a larva beaten off alder, full fed August 18: it so closely resembled the larva of C. russata that at the time I did not detect the difference: the pupa was covered with a bloom like that of C. trapetzina. I had seven or eight larvæ of C. obliquaria in 1856, and bred the perfect insect in 1857: I beat them off broom (*Spartium scoparium*) towards the middle of August: this larva closely resembles that of C. spartiata, but is a much darker green, and wants the yellowish tinge; it is also thicker towards the head, and not so smooth: I think there can be no doubt whatever that Lyonet is entirely mistaken in supposing that it feeds on bramble; I am convinced that it is exclusively a broom feeder: the perfect insect is out from the middle of May to the middle of July: I took it, this last season, without intermission between May 20 and July 7: the larva of C. spartiata is full fed in June and July; it has sometimes a regular yellow stripe on each side. M. Guenée remarks upon the difficulty of rearing the larva of E. cervinaria through the winter: any one who takes the trouble may find the larva abundantly in June by searching among the leaves of Malva sylvestris, and sometimes on the common garden hollyhock: it is then not at all difficult to rear, but must have plenty of air, as it perspires very freely. —*H. Harpur Crewe; Stowmarket, March* 9, 1858.—*Id.*

Successful removal of the Eggs of the Ichneumon from a Larva of Deilephila Galii.—One day, towards the end of October last, when staying at Deal, we were looking for the larva of Deilephila Galii, after the ground had been carefully hunted both by Mr. Stevens and myself, so that we scarcely hoped to meet with any, and were about to relinquish our search in despair, when we came upon a fine larva nearly full fed. This was immediately boxed and carried home in triumph. On opening the box, however, our satisfaction was considerably diminished on perceiving some twenty or thirty whitish spots, which turned out to be Ichneumon eggs. Having heard that the attempt to remove the eggs was sometimes successful, we determined to make the experiment. Our first trial was with a fine needle, but this proved a complete failure, as the needle would not penetrate the hard shell of the egg: we then tried to crush the eggs with a small pair of fine-pointed forceps; this, though a satisfactory mode of destroying the eggs, caused great annoyance to the larva, which jerked itself into a circle when they were applied, so that we feared it would impale itself on the sharp points. The servant then brought a large darning needle, and this proved a most efficient instrument, piercing the eggs, and, in some cases, lifting them off entire, without apparent inconvenience to the caterpillar. In a few days it laid up to change, and soon appeared a fine healthy pupa. In the middle of December it was placed in a small fern-glass by the fire, the pupa covered with moss, which was kept constantly damped, and about a month afterwards came out a fine female, without the slightest blemish.—*J. T. Syme;* 11, *Gower Street, Bedford Square, February* 18, 1858.—*Id.*

Capture of two Coleopterous Insects new to the British List. — I have much pleasure in recording the capture of two small, but very interesting, genera, Sphærius and Ptinella, both, as far as I can discover, new to the British Fauna: they were taken by myself, some time ago, in Oxfordshire, but, in consequence of the removal of our family from that part of the country, had become till lately almost forgotten. The Sphærius acaroides, *Waltl.*, was found in June, 1854, on a wall in our garden: this is a well-named insect; it exactly resembles in size, shape and colour, the black shining Acarus often found in decaying vegetable matter, and requires a close scrutiny to assure oneself that it is a Coleopterous insect at all. The Ptinella belongs to that section of the genus which has no visible eyes or wings: it appears to be distinct from any species hitherto described; the nearest approach to it is the Ptilium apterum of Guérin, figured in Gillmeister's Monograph of the Trichopterygidæ, but it differs from that species in many important characters, which I will shortly notice: it was taken at Weston-on-the-Green, in Oxfordshire, in July, 1853: the velocity of its motions is wonderful, far exceeding the well-known activity of the true species of Trichopteryx, and would seem impossible to an animal not endued with the power of sight. While I was observing it, it coursed several times along the back of a large spotted slug, Limax maximus, whose slimy skin did not in the least impede its motions.

PTINELLA BRITANNICA.

Elongata, haud depressa, aptera, rufo-testacea, fortius punctata; oculis nullis; capite lato, obtuso, rufo-piceo; pronoto transversali, postice contracto, rufo-piceo, angulis anterioribus productis, posterioribus rectis; elytris capite atque pronoto longioribus, magis subtiliter punctatis, testaceis, ad humeros angustis, medio latioribus, margine postico valde sinuato; abdomine elongato, lateribus marginatis, segmentis quinque apertis, penultima magno, obtuso; antennis et pedibus pallidis, elongatis, gracillimis, singulis antennarum articulis corona setarum nigrarum ornatis.

Elongate, rufo-testaceous, deeply punctured, clothed with a pale pubescence. Head wide, rounded in front, rufo-piceous behind, paler towards the mouth. Prothorax rufo-piceous, transverse, about as long as the head, much contracted near the base, with the anterior angles produced, embracing the base of the head, and the posterior angles nearly at right angles. Elytra testaceous, more finely punctured and rather longer than the head and prothorax united, narrowest at the shoulders, and widest about the middle, with the posterior margin very deeply sinuated. Abdomen long, with its sides deeply margined, five segments uncovered, the penultimate large and very obtuse, the apical segment very small. Legs and antennæ pale, long and slender; on the upper part of each articulation of the antennæ is a conspicuous whorl of strong black setæ. Length $\frac{3}{8}$ lin.

This species differs from P. apterum, *Guér.*, in the much larger size, in the shape of the prothorax, which is much wider in front; in the contracted extremities and deeply sinuated hinder margin of the elytra, and in the obtuse form and margined sides of the abdomen.—*A. Matthews; Gumley, Market Harborough, March* 16, 1858.

Entomological Club.

(Continued from page 5839).

Last year we published a statement of the objects of the Entomological Club, an announcement of the times during which the collection might be consulted, a list of the Members, and a Catalogue of the desiderata as far as the new arrangement had been completed. Of the then desiderata the following have been acquired :—

Petasia nubeculosa, by purchase.
Lithosia complana, presented by Mr. Bond.
„ pygmæola, by Mr. Birchall.
Lasiocampa Callunæ, by Mr. Bond and Mr. Backhouse.
Gastropacha Ilicifolia, by the late Mr. Weaver.
Psyche Febretta, ditto.
„ opacella, ditto.
Cymatophora fluctuosa, by Mr. Doubleday.
Acronycta strigosa, by Mr. Doubleday and Mr. Bond.
Synia musculosa, by Mr. Bond.
Miana expolita by Mr. Birchall.
Noctua glareosa, by Mr. Hague and Mr. Killingback.
Dasypolia Templi, by purchase.
Epunda nigra, by Mr. Hague.
Aplecta occulta, ditto.
Hadena suasa, ditto.
Cucullia Lychnitis, by Mr. Doubleday.
„ Asteris, by purchase.
Stilbia anomala, ditto.

For all presents votes of thanks have been passed to the donors at the monthly meetings of the Club. The collection has been visited every Thursday evening by entomologists desirous of naming their captures. The new arrangement has been proceeded with as far as the end of the Geometræ, and a list has been prepared exhibiting the exact state of that portion of the collection. The numerous offers for barter have been respectfully declined: entomologists, seeing that Chrysophanus Hippothoë (dispar of English collections) was not named as a desideratum, have applied for it with very much freedom, and have offered Lithosia complana, Noctua neglecta, and several

Xanthiæ in exchange; Xanthia cerago has also been offered for Polyommatus Acis, "if fine." The following list of Geometræ has been drawn up on a somewhat different plan from the previous one: those species which are absolutely unrepresented are marked with an asterisk; the rest are not intelligibly represented, that is, the specimens, having mostly been taken by myself many years ago, are faded or ill set, or injured in some way or other; in some instances the species is represented by one or two specimens presented by friends. In all instances where the name occurs the space allotted for the species is not filled, and, as only four specimens are desired, unless in the instance of strongly marked varieties, it will be manifest that the object of thus soliciting assistance is not the acquisition of long series.

List of Geometræ desiderata to the Entomological Club.

Eurymene dolobraria
Pericallia syringaria
Selenia lunaria
„ illustraria
Crocallis elinguaria
* Ennomos alniaria
„ tiliaria
„ fuscantaria
„ erosaria
* „ angularia
Nyssia hispidaria
Cleora viduaria
„ glabraria
Boarmia abietaria
„ cinctaria
Dasydia obfuscata
Geometra papilionaria
Nemoria viridata
Iodes vernaria
„ lactearia
Phorodesma bajularia
Hemithea thymiaria
Ephyra poraria
„ trilinearia
„ omicronaria
„ orbicularia
Hyria auroraria
Asthena Blomerata
* Acidalia rubricata
„ scutulata
„ bisetata
„ reversata
* Acidalia contiguaria
„ rusticata
„ osseata
* „ holosericeata
„ incanaria
* „ obsoletaria
* „ straminata
„ subsericeata
„ immutata
„ commutata
* „ strigilata
„ emutaria
* „ inornata
„ degeneraria
„ emarginata
Cabera rotundaria
„ exanthemaria
Corycia taminata
Aleucis pictaria
Macaria alternata
„ notata
„ liturata
Strenia clathrata
Panagra petraria
Numeria pulveraria
Scodiona belgiaria
Selidosema plumaria
Fidonia carbonaria
„ piniaria
„ pinetaria
„ conspicuata
Minoa euphorbiata

Scoria dealbata
Aspilates, *all*
Abraxas ulmata
Lomospilus marginata
Pachycnemia hippocastanaria
Oporabia filigrammaria
„ autumnaria
Larentia multistrigaria
„ rufocinctata
„ salicata
„ olivata
Emmelesia, and
Eupithecia: any good specimens much desired
Collyx sparsata
Lobophora sexalata
„ hexapterata
* „ viretata
* Lobophora polycommata
Thera juniperata
„ variata
„ firmata
Melanippe tristata
Anticlea rubidata
„ badiata
„ derivata
„ berberata
Phibalapteryx, *all the species*
Scotosia undulata
Cidaria sagittata
„ populata
„ fulvata
„ pyraliata
* Lithostegia nivearia
Chesias obliquaria

Those twelve species to which an asterisk is prefixed are altogether absent from the collection; the rest are required to supply the place of wasted, discoloured or injured specimens, or to make up the number of four specimens, the shortest series which I think can really illustrate a species.

The number of specimens of all classes of insects received since the last report is 363; the number of duplicates given away on Thursday evenings is 417.

Proceedings of Societies.

Entomological Society.

March 1, 1858.—Dr. Gray, President, in the Chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'The Journal of the Royal Agricultural Society of England,' Vol. xviii. Part 2; presented by the Society. 'Journal of the Proceedings of the Linnean Society,' Vol. ii. No. 7; by the Society. 'The Natural History Review,' Vol. v. No. 1; by the Dublin University Zoological Association. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part xiii. Noctuidæ; by the Author, Francis Walker, Esq., F.L.S. 'The Zoologist' for March; by the Editor. 'The Journal of the Society of Arts' for February; by the Editor. 'The Literary Gazette' for February; by the Editor. 'The Athenæum' for January; by

the Editor. 'The Entomologist's Weekly Intelligencer,' Nos. 67 to 74; by H. T. Stainton, Esq.

Exhibitions.

Mr. Smith exhibited a box of insects sent him by Mr. Foxcroft, by whom they were captured in the Free Town Garden and suburbs of Sierra Leone, in December last. The Lepidoptera included Papilio Hippocoon and P. Pylades, a fine Charops, apparently the female of C. Brutus, and both sexes of Euchromia instructa. Amongst the Coleoptera were Tetralobus flabellicornis, Sternotomis mirabilis and S. regalis, Prosopocera bipunctata and Dirphya, n. s.

Mr. Smith also exhibited a Coleopterous insect allied to the genus Myrmedonia, which he has found amongst a number of specimens of the driver ant (*Anomma Burmeisteri*), sent from Sierra Leone with the before-mentioned collection.

Mr. Stevens exhibited some beautiful Lepidoptera and Coleoptera, taken by Mr. Wallace in Ke and Aru Islands, near New Guinea, of which the most remarkable were the sexes of a variety of Ornithoptera Priamus, Papilio Enchenor, P. Ormenus, P. Ambrax, Hestia D'Urvillii, some fine species of Drusilla and beautiful Erycinidæ, mostly hitherto unknown, Cocytia D'Urvillii, and some singular Geometræ, &c. The Coleoptera included three handsome species of Eupholus, a gigantic new Mecocerus, several brilliant Buprestidæ, some fine and new Lomoptera, numerous species of the Papuan genus Tmesisternus, and a noble Batocera, very distinct from all the known species of the genus.

Mr. Smith exhibited some Hymenoptera captured by Mr. Wallace in the Aru Islands; amongst the more remarkable were a species of Zuthus, entirely of a fine brassy green colour, a new and beautiful species of Tremex, several very beautiful Pompili, and numerous Formicidæ; amongst the latter the finest species of Myrmica perhaps hitherto discovered; three species of Odontomachus, and some entirely new forms of the genus Polyrhachis.

Mr. Westwood observed that it was extremely interesting to see the fine Papilios, &c., which had been found seventy years ago by the Dutch in the Islands of the Indian Archipelago, and since almost forgotten, were now being re-discovered and sent to this country in such admirable preservation: the best thanks of entomologists were due to Mr. Wallace and those who, like him, hazarded their lives in unhealthy tropical climates to collect objects of Natural History, and he trusted they would receive the pecuniary reward they so well merited.

Mr. Westwood exhibited a Tortrix of the genus Carpocapsa, allied to C. splendana of Europe, which had been bred by Mrs. Wood, of St. Leonards, from one of the "jumping seeds" sent from Mexico by Mr. Lettsom, and exhibited at the Meeting of the Society in October last: he observed that, according to a long statement on the subject which had appeared in the 'Journal des Debats,' some of these seeds had lately been received at the Jardin des Plantes in Paris, where the larva had been pronounced to be Coleopterous; but the specimen exhibited proved the correctness of the opinion entertained by entomologists in this country, that they belonged to a Lepidopterous insect. The question as to the mode in which the inclosed larvæ are able to execute the jerking movements exhibited by the seeds remained still an interesting question, for, supposing they were caused by the caterpillar adopting a process similar to that employed by the cheese-hopper, it must be regarded as a solitary instance of such action amongst lepidopterous larvæ.

Mr. Westwood also exhibited the larva of Drilus flavescens, which had been sought for in vain in snail-shells during the excursions of the Society at Reigate, where the males were not uncommon. He had received the larva from a correspondent who had found it in a snail-shell, and it agreed with the figures which had been published in France, where its transformations had attracted considerable attention some years ago, and where the female had been described as a distinct genus, under the name of Cochlevetonus.

Dr. Gray observed that this larva was known to Petiver one hundred years ago.

Mr. S. S. Saunders exhibited two specimens of Leptoderus Hohewartii (Stagobius troglodytes, *Schiodte*, Trans. Ent. Soc., N. S., v. 1, pl. 9, figs. 1, 1 a), one of the blind beetles from the Proteus Cave at Adelsberg, in South Austria. The species, which pertains to the Silphadæ (although the extraordinary elongation of the antennæ and legs give it an appearance quite dissimilar to that of any other genus in the family), was found by Mr. Saunders on a large Stalactite in the deepest part of the cave.

Mr. Smith exhibited some Hymenoptera and their nests, sent from Port Natal by M. Gueinzius, and read the following note communicated by him:—

On the Habits of the Hymenoptera of Natal.

"A species of Stilbum lays its eggs on the collected caterpillars stored up by Eumenes tinctor, which constructs a nest of mud and attaches it to reeds, &c., not in single cells, but a large mass, in which cells are excavated, similar to the nest of Chalicodoma micraria. How does the fly, with such an apparently weak instrument, penetrate such a structure? First, it uses it as a gimlet, and when its point has a little penetrated, then as a saw or rasp: it likewise feels with its ovipositor, and, finding an unfinished or an empty cell, it withdraws it immediately, without laying an egg. A great number of insects breed annually in my house, for which purpose I have always a door or window open to give them free ingress and egress. I once observed a wasp (Synagris calida), flying about my door; I attempted to catch it, when it flew off, but I observed that it returned again and again; at length I noticed some fresh clay stuck on the door, indicating an intention of building: I was anxious to observe its movements and to reconcile it to my standing the door quite back, inwards; this I effected by partly closing it and then watching the return of the insect with its clay; when it was settled, and was eagerly engaged, I moved the door slowly and carefully, and thus by degrees, in the course of two days, I had the satisfaction to see the Synagris during its building operations: it soon became accustomed to the closest observation, and took no notice of me. One day the Synagris, having finished a cell, and not having time to commence a new one, had to perch on the exposed nest during the night; the light of my candle, however, attracted it, and it flew into the room, and took shelter behind a window-curtain until the morning. This insect collects the larvæ of Catocala and other Noctuidæ which secrete themselves in the fissures of tree-bark, between seed-vessels or contracted leaves. I once observed this Synagris sitting on the leaves of a fine Zinnia elegans; it wandered about as a pointer dog would do, inserting its long maxillæ here and there, and getting more and more excited every moment; at length it began to buzz loudly, and struggling it drew forth at last a hidden caterpillar from the middle of one of the flowers of the Zinnia. No tiger could have been more furious over its prey: with what fury it ran its sting into the abdomen of its helpless victim again and again, and with what a buzz of savage glee it dragged it about from leaf to leaf! at length, striding over it, the caterpillar

lay motionless, but the suckers of its feet stuck fast, the wasp then had to stop to loosen them; this it did very cleverly by curving its abdomen like a hook under the belly of the caterpillar, using its point like a lever; the stoppages occurred so frequently that the wasp got tired of them, so, turning the caterpillar on its back, all further obstruction was avoided.

"Large spiders and caterpillars become immediately motionless on being stung, and I cannot help thinking that the poisonous acid of Hymenoptera has an antiseptic and preserving property; for caterpillars and locusts retain their colours weeks after being stung, and this, too, in a moist situation under a burning sun.

"*Anthidium cordatum.* This insect forms its cells of vegetable down, glued together with a balsam or resin, which it procures from a flower which exudes a brown balsam; with this it glues the hair together. I have frequently seen the Anthidium in the middle of the flowers, and have no doubt this is the plant which supplies the materials for its nest. I think the plant belongs to the Euphorbiaceæ; it is described by Thunberg in 'Flora Capensis.'

"*Pelopæus chalybeus.* A number of this insect annually make their nests under my verandah; these they construct in the hollow tubes of the bamboo. Having stored up a number of spiders, they resort to the forest, where I have seen them scrape the white birds' dung off the leaves of plants; this they moisten with saliva into a pulp, shape it into a lump, and carry it off. With this material they construct the divisions between the cells.

"*Anthophora* ———? This bee infests the walls of my house inside and out; there is not a single hollow or hole that is not tenanted by one of these industrious, tame and stingless little bees. The hotter the weather becomes the harder they work. They appear twice in the season, November and February. When prevented from going abroad they are not idle, but busy themselves in enlarging and cleaning out their nests; this I have frequently heard them doing in the middle of the night. This bee has a parasite; it is a Crocisa; it inserts its antennæ into the cells to ascertain if there is a store of pollen collected; if it finds the owner at home it tries to squeeze past it; if the passage is too narrow it lays hold of the poor bee, and pulls him out of his own door; the bee, without taking any notice of the intruder, flies away after its own business. This Crocisa has the same habit as many other species of Apidæ, namely, that when at rest it does not sit down, but lays hold with its mandibles of the outermost points of a twig or shrub, keeping its body out in a horizontal position. A number of species, probably all males, may be found every evening, occupying similar situations, attached to twigs, blades of grass, &c. It is a strange sight to see a grass or shrub bearing a number of gray, brown or black hairy bees in the place of seeds or flowers.

"The large (Sphex) Pompilus preys upon a very large hairy spider, which lives in thatched roofs, under verandahs, &c. I have seen this spider fly in the greatest terror from the Sphex, who, however, soon overtook him; the spider kept his enemy at a distance with his long legs for some time, until, exhausted at last, it drew its legs close to its body and remained motionless; the Sphex, like a tiger, was soon upon him, and, thrusting his sting into his thorax, soon rendered him motionless; the Sphex then, walking backwards, dragged his victim out of doors.

"I have noticed two large species of Xylocopa; the first black, with a ferruginous thorax, the male of which closely resembles the female; the second black, with long white hairs on the margin of the abdomen; both excavate dead branches, posts,

&c. The male of the latter species I have reason to believe is a large yellow one. Two years ago I broke a hollow fence post, in which I found a species of Xylocopa; the females were black, the males of a pale fulvous colour. This species was of a smaller size."

Mr. S. Stevens exhibited an entomological store-box lined with Croggon's patent felt, instead of cork, for which, he observed, it appeared to be a tolerably good and very cheap substitute.

Mr. Stevens announced that Mr. Shield proposed to visit Bahia or Paraguay, in search of insects and other objects of Natural History, and was anxious to obtain subscribers to enable him to do so.

Mr. Stainton read the following

Note on a curious little Geometra taken in London by Mr. Hunter.

"Some years ago Mr. Hunter met with a little species of Geometra, apparently of the genus Acidalia, in his garden in Bloomsbury Street. The specimen was unfortunately much injured on one side, and the other side was not so brightly marked as could have been wished; yet enough was left to show that it belonged to none of our existing species.

"In 1855 I examined this specimen, and referred it to the circuitaria of Hübner, remarking at the time, 'No good figure of this exists,' from which it may be assumed that I did not find a complete agreement between the insect and Hübner's figure. The reason of this is now obvious: Hübner's figure of circuitaria is cited by Guenée as an excellent figure; hence it cannot be intended for Mr. Hunter's insect.

"Mr. Hunter's insect thus loses the name by which it has passed current for two years, and what is to become of it? We all remember how we were startled by the announcement of Eriopus Latreillii having been bred at 24, Bloomsbury Street, and when I again looked at the little Acidalia I was haunted by lurking suspicions that, perhaps, what I had before me was only another case of accidental importation.

"Having been lately working at the genus Acidalia, I had the markings of each species fresh in my recollection, and I became very strongly convinced that this specimen must be placed near bisetata and trigeminata, in spite of the great difference in the ground colour.

"Referring again to Guenée's volume, I found, almost immediately following trigeminata, a species which not only answers our purpose of giving a name to Mr. Hunter's late circuitaria, but also affords us an explanation of the peculiar habitat of London for a new British Geometra.

"The insect in question is Acidalia herbariata and Fischer's figure of pusillaria is referred to as the best representation of the insect. The first glance at Fischer's figure was anything but reassuring: instead of the powdery-looking insect I had before me I saw a bright neat insect, with a well-defined dark central band. Not content with the figure, I referred to the description, which I found far more satisfactory.

"The ground colour of all wings is pale loam-colour, mixed with black scales, which form fasciæ and strigæ, whence the markings appear blackish gray. The space between the base and the middle fascia is dull; the fascia is in many specimens 'very dark'; it seems to have been one of these that Fischer has figured 'broadest at an externally protruding point in which is a black dot, narrowest below the middle,

being rather broader again on the inner margin.' In the broader parts the pale ground colour appears through as spots. Beyond the fascia and parallel to it is a line, often very dark, behind which the space to the fringes is clouded with dark and bisected into two equal parts by a wavy line of the pale ground colour; the inner portion of these dark parts has below the middle two contiguous short streaks or spots pointing towards the cilia,—a character which no specimen is without.

"On the posterior wings are similar markings, except the central fascia, which is replaced by a dark cloudy stripe which borders the duller basal portion; beyond it near the following line and not far from the costa is a black longish *punkstrich*.

"The elongate form of the central spot of the posterior wings is well shown in Fischer's figure, and is perceptible in Mr. Hunter's specimen, and the two dark teeth so especially mentioned by Fischer are the most conspicuous markings of the anterior wings; hence, in spite of Fischer's very different-looking figure, I feel confident that his insect and Mr. Hunter's are the same.

"Now, how do we account for the insect occurring in London? One-half of the world little knows how the other half lives; and we may suppose that one-half of the geometric larvæ have little conception of what the other half feed upon. At any rate the tastes of this particular insect are very peculiar. It does not feed on a fungus like our other London friend, Boletobia fuliginaria, it does not feed on lichens or moss. On what then? On the dried plants in collections.

"We read in Fabricius, Supp. p. 457, 'Habitat in herbariis folia plantarum exsiccatarum exedens. Mus. Dom. Bosc.'

"I supposed Dom. Bosc. was anything but pleased at this new collecting ground opened out to him; but if it be so that a geometric larva finds nutriment in dried plants it is well we should know of it, as a looper casually observed in a herbarium would be supposed to be there quite by accident.

"On referring again to Fischer we read that 'the perfect insect occurs at the end of July on palings and walls near houses, often indeed in houses, but especially in warehouses where dried plants are kept, since the larva feeds exclusively on dried plants, and as far as we know never touches green ones.'

"It feeds all through winter on these dry plants, and is sometimes very injurious to herbaria, changes in June to a pupa in a slight cocoon in a corner or between dried leaves, and in ten days or a fortnight the perfect insect appears.

"Now the whole mystery seems explained; and the occurrence of a devourer of dried plants in Bloomsbury Street, in the immediate vicinity of the British Museum, where perhaps more specimens might be obtained by a careful search, seems perfectly intelligible."—*E. S.*

Zoological Society.

Tuesday, February 23, 1858.—Dr. Gray, F.R.S., V.P., in the chair.

Mr. Gould brought before the notice of the Society a highly interesting series of birds collected by Mr. A. R. Wallace in the Aru Islands. Among them were two species of birds of Paradise—Paradisea apoda and P. regia. Hitherto these magnificent birds have only been sent to this country in a mutilated condition, their skins having been prepared and dried by the Papuans, frequently without their wings, and

almost always without their legs. Mr. Wallace's skins, however, are perfect, and in the highest possible condition: they comprise not only adult males and females, but young birds in various stages of development. Mr. Gould remarked that the Ornithology of the Aru Islands, like that of New Guinea, partook more of the character of the Australian Fauna than of any other. The woodpeckers (*Picidæ*) and hornbills (*Bucerotidæ*), so common in India and the Indian Islands, are totally wanting, while the honeyeaters (*Melaphagidæ*) and kingfishers (*Halcyonidæ*) are very numerous: on the other hand, the collection did not contain a single Malurus or any of the finches, forms represented by numerous species even in the northern parts of Australia. Mr. Gould, in remarking upon the beautiful plumes which adorn the Paradiseæ, stated that he considered they were assumed, or are in their most perfect state, just prior to the breeding-season, and that the bird was then adorned in its greatest beauty,—a beauty apparently assumed not only for the purpose of attracting the females, but to exhibit to each other their gorgeous finery, when they assemble and perform many curious and extraordinary evolutions. In South America the cock of the rock (*Rupicola*) has many singular habits at the like season, while in Australia the bower birds attract every one by the curious structures they make for a similar purpose. Mr. Gould instanced also the peacocks, the turkey, and the well-known ruff of the British Islands, as birds which assemble and make such displays.

Mr. G. R. Gray communicated a paper, containing a list of the birds, with descriptions of the new species, obtained by Mr. Wallace in Kè and Aru Islands. The collection consisted of 121 species of birds (showing great perseverance and energy on the part of Mr. Wallace), many of which were new and highly interesting species, and it also exhibited the sexes of several species that were hitherto unknown: Mr. Gray had therefore, in this paper, drawn up a list of them, with descriptions.

Mr. Sclater read notes on some birds from Southern Mexico, lately received by M. Edward Verreaux, of Paris, in which he made some remarks on specimens of such of the species as had not been included in his former lists, read before the Society, together with a few corrections as to statements made in his previous papers on the subject.

Mr. Sclater communicated a note on the skeleton of the sheathbill (*Chionis alba*), by Mr. T. C. Eyton.

The Secretary read a paper by Mr. W. Thompson, containing remarks on the British Actiniadæ, with a proposed rearrangement of the genera.

The Secretary also read a paper on Nemophis, a new genus of riband-shaped fishes, by Dr, Kaup, of Darmstadt.

Dr. Gray read a paper containing observations on the genus Cuscus, with the description of a new species, characterized under the name of Cuscus Celebensis.

Dr. Gray read a second paper containing a list of Mammalia, sent from the Aru Islands by Mr. A. R. Wallace. Two new species were described under the following names:—Dactylopsila trivirgata and Myoictis Wallacei.

Dr. Gray read another paper, on Aphrocallistes, a new genus of Spongiadæ, from Malacca: the type, which he named Aphrocallistes Beatrix, was received in 1842 from Capt. Sir Edward Belcher. Dr. Gray also read a description of Aphrocerus, a

new genus of calcareous Spongiadæ, brought from Hong Kong by Dr. Harland: the type specimen was named Aphrocerus alcicornis.

Tuesday, March 9, 1858.—Dr. Gray, F.R.S., V.P., in the chair.

The Secretary read a monograph of the genus Miniopteris, by R. F. Tomes, Esq., in which a new species was characterized under the name of M. Australis. It was not until after he had arranged and named the specimens in the British Museum and other collections that Mr. Tomes found this species to be an inhabitant of Timor (and probably other of the islands of the Indian Archipelago) as well as of Australia, and that therefore the name of Australis was not strictly appropriate; but, to avoid the confusion which might possibly arise from a change of name, he thought it desirable that it should remain unaltered.

Mr. Sclater, at the request of Mr. J. H. Gurney, exhibited some interesting specimens from the fine collection of rapacious birds belonging to the Norwich Museum, and characterized two of them as new, under the names Buteo zonocercus and Scops usta, the former being from Guatemala, the latter from Ega, on the Upper Amazon, where it was collected by Mr. Bates.

The Secretary also read papers by Mr. H. Dohrn, Mr. Mörch and Mr. Hanley, describing various new species of shells, principally in the Cumingian collection.

The Secretary likewise read a paper by A. Leith Adams, M.B., Surgeon 22nd Regiment, "On the Habits, Haunts, &c., of some of the Birds of India." Throughout this very interesting paper Dr. Adams gave only the result of careful examination and experience, no species being named whose identity he had not confirmed; such as are doubtful he had left unnamed and had given a description shortly after death.

Dr. Gray read a paper "On the power of dissolving Shells possessed by the Bernhard Crab." In a note to his paper "On the Formation and Structure of Shells," in the 'Philosophical Transactions' for 1833, he stated it as probable that some Bernhard crabs had the faculty of dissolving shells, it not being unusual to find the long fusiform shells which are inhabited by these animals with the inner lip and a great part of the pillar on the inside of the mouth destroyed, so as to render the aperture much larger than usual. Dr. Gray, having continued his observations on these shells, was quite convinced that certain species of Bernhard crab (*Pagurus*) have this power, some possessing it to a much greater degree than others.

Dr. Gray read a second paper, intituled "Proposal to separate the Family of Salamandridæ, *Gray*, into two Families, according to the form of the skull." —*D. W. M.*

On Reason and Instinct. By the Rev. J. C. Atkinson, M.A.

In my first paper on "Reason and Instinct" (Zool. 2333) I gave definitions of these two essences or qualities, as follows: "In the first place, as to Reason. 'The perception of truth, as it is in itself, is commonly ascribed to our rational faculties; and these have, by Locke and others, been reduced to two, reason and judgment. The former is said to be conversant about certain truths, the latter chiefly about probabilities.' Dr. Reid says, 'We ascribe to reason two offices or two degrees: the first is, to judge of things self-evident; the second, to draw conclusions that are not self-evident from those that are.' Secondly, as to Instinct. Instinct is a 'certain power or disposition of mind, by which, independent of all instruction or experience, without deliberation and without having any end in view, animals are unerringly directed to do spontaneously whatever is necessary for the preservation of the individual or the continuation of the kind.' 'Instinct,' writes the author of 'Ancient Metaphysics,' 'is a determination given by Almighty wisdom to the mind of the brute to act in such or such a way, upon such or such an occasion, without intelligence, without a knowledge of good or evil, and without knowing for what end or purpose he acts.' One more quotation, which serves, as it were, to bring together and contrast these two sets of definitions, and we will be content. 'Actions performed with a view to accomplish a certain end are called rational actions, and the end in view is the *motive* to their performance. Instinctive actions have a *cause*, viz., the internal impulse by which they are spontaneously performed; but they cannot be said to have a motive, because they are not done with a view to consequences. Thus a man gives charity in order to relieve a person from want; he fights for his country in order to repel its enemies. Each of these actions is performed from a motive, and therefore they are rational actions. An infant is impelled to suck the breast, but he knows not that it is necessary for his preservation: it is an action that has no motive, and therefore is not rational; but, as it is performed by a spontaneous exertion of the infant, it is not to be attributed to mere mechanism. It is, therefore, an instinctive action.'" And then, in a note, I add, "The action of breathing is mechanical, being performed without either motive or spontaneous exertion."

To the definitions here laid down I endeavoured to adhere, and I think not without success, in the paper from which I have extracted

them, and no less in that which was published in two parts last year (Zool. 5452 and 5565). I had once thought of prefixing at least a part of these definitions to the second paper; and possibly I misjudged in not doing so, seeing so considerable a space of time had elapsed since the publication of the first paper; not that, if I had done so, I should have obviated all Mr. Tagart's criticisms* (Zool. 5737), or perhaps any considerable portion, but at all events the subject might have been rendered clearer to those readers who had not my first paper to refer to.

With deference to Mr. Tagart, I venture to think the definitions just quoted are sufficient for the purpose of a writer, who makes no claim to be considered scientific, in a 'Popular Magazine of Natural History.' I am not careful to contend with him whether Instinct and Reason are or are not "terms of ignorance." I submit that if we take the former to imply the origin, in the brute, of action upon ideas implanted by the Creator in its mind, and independently of experience, of instruction, of deliberation, of any distinctly proposed end in view,—and this is what our definitions convey,—"we know," quite well enough, "what we are talking about," when we use that term, to hope that our inquiries or discussions on the subject involved may lead to some practical result. We talk of electricity or the electric fluid; we talk, too, of magnetism or the magnetic fluid: are not both Electricity and Magnetism as much "terms of ignorance"† as Instinct or Reason? What do we know of either that we cannot, after the same manner, predicate of Instinct? In either case we observe certain phenomena; we observe, further, that these phenomena recur in obedience to certain laws: the former testify to the existence of a

* The paper in question appears to have drawn forth notices from three contributors to the 'Zoologist.' That from the pen of Mr. Couch gives an explanation which, it appeared to him, was rendered necessary, by the form of my quotation from his book on Instinct. The other two are critical. Capt. Hadfield's stands first in order of time: the matter at issue between that gentleman and myself depends on the meaning of the phrase "information properly so called," and of the two words "allusions" and "references;" and therefore, as one good turn deserves another, to requite him for referring me to Montagu's 'Ornithological Dictionary,' I beg to refer him to any tolerable English Dictionary. With Mr. Tagart, who imposingly proclaims his "style and titles" as a "logician and metaphysician," and is therefore both champion and herald in his own single person, I must deal in the text.

† "We are totally ignorant . . . of the manner of the existence of electricity in bodies, whether it be a material agent, vibrations of ether, or merely a property of matter."—*Somerville's Physical Sciences*, 301. Precisely the same must be said of magnetism.—See *Id.* 342.

certain power, or property, or agent; the latter to some of the qualities or operations, or both, of such power, property or agent; but neither one nor the other, nor both together, reveals to us what electricity, what magnetism, really is: and just so it is with Instinct. We see the phenomena, and we see some of the laws under which they recur; but the rest is all surmise, except in so far as we know that the thing we mean is implanted by God the Creator in the living creature, just as we know the things we mean by electricity and magnetism are, by the same Mighty Hand, inseparably connected with the material creation at large. If men of science had been apt to say, "We must know what electricity *is* in amber, glass or silk,—what magnetism *is* in the loadstone,—before we can decide whether one or the other is to be found in metallic veins, in the rocks, in the earth at large, in the atmosphere," I fear we should now know very nearly nothing at all about either beyond the bare fact of their existence: in other words, such a proposition would have been not simply an unnecessary, but a fatal, obstacle to the acquisition of any sound or certain knowledge about either of those mysterious essences. I cannot, therefore, agree with Mr. Tagart, that "before we can decide whether animals have reason, we ought to know at least what it is in man," (Zool. 5738), any more than I can that we must know what Instinct essentially is before we can decide "how far animals, or creatures whom we are accustomed to speak of as guided by instinct,* are participants of reason" (Zool. 5737). I think that if all thoughtful men are agreed on what are to be considered unquestionable *indicia* of Reason, or signs and tokens of its exercise, it matters not, so far as our inquiry is concerned, what Reason essentially is, or whether it be assumed "to have its root in sensation" (Zool. 5739), or be considered as an emanation from the Divine Mind in the image of which we were created. Wherever I can succeed in tracing these *indicia* in any

* I should say Horne Tooke would express no obligation to Mr. Tagart for making him out (Zool. 5737) so great a blockhead or so poor a Latin scholar. But instead of giving any comment of my own on Mr. Tagart's derivation of Instinct, "after Horne Tooke," I prefer subjoining the comment of an etymological friend of mine. He says, "His *in*, *tinctus*, is the veriest school-boy folly. *Instinguo* is identical in root with *instigo*, and the root is that of our 'stick,'—Greek στίζω, στίγμα, &c. The exact definition of any word, I am inclined to hold, may be taken from its true etymology; and hence you would define *In-stinct* to be an *inward pricking* or *goading*, or something which *sticks into you* within, like a spur. To 'distinguish' is to mark out, or separate things from each other by points,—to divide into στίχη or rows: compare 'distich.' As an illustration of this sense of sticking or pricking, you will remember Falstaff and Justice Shallow, when the former is 'pricking' his men." See also Richardson's English Dictionary.

individual of the lower orders of animal creation,—to whatever extent they are discernible, whether simply so or to a high degree,—there, and to that extent, I believe, and I express my belief, that Reason, be it what it may in man, exists in the brute: and, in like manner, if I can succeed in distinguishing and defining what are the marks of Instinct, the signs and tokens of its presence and operation, without any attempt at a metaphysical determination of what that essence or quality really is, and without running the risk—which I very likely should run if I made the attempt—of making words my masters instead of my servants, I think I am in a position for carrying on an inquiry which depends, in no very perceptible degree, upon anything but observed phenomena and logical reasoning upon such phenomena.

Before I proceed further, I may as well at once admit the justice of Mr. Tagart's criticism on the expression "Instincts peculiar to man," and on the use of the word Instinct in the plural; so far, that is, as such use "implies that there are many different kinds of instinct." The expression was employed inadvertently, and overlooked in revision. What I meant and what I ought to have said was, "the instincts in which man is a participant;" and it would doubtless have been more correct—and, possibly, more pedantic as well—to have said, all through, "an operation of Instinct" instead of "an instinct," and "operations of Instinct" instead of "instincts," however much ordinary use may seem to excuse, or even to require, such want of precision. Perhaps, after this admission, I may be allowed to ask how came Mr. Tagart, who assumes to be "a logician and metaphysician," when he flings his stone at my window and breaks his pane, to forget the vitreous composition of his own domicile so far as to confound "elements" and "operations"? (Zool. 5742). Surely these are not synonymous or convertible terms; at least I, who don't set up as logician and metaphysician, did not use them as such; on the contrary, I always thought they stood for things, or represented ideas, very essentially distinct and different. Methinks it would sound strange to talk of hydrogen and oxygen as the "operations" of water, or of a thorough good drenching as being the "element" of a sufficiency of that fluid properly applied. I might gratify the love of mischief, which is a sort of "instinct" in so many of us, by another "shy" or two at Mr. Tagart's "house," and chuckle as I heard the smash ensuing; but I would fain turn to something, less amusing it may be, but at the same time, I would hope, less unprofitable.

I am quite aware that there is a difficulty in the application of the

word Reason in our inquiry; but it does not appear to me that Mr. Tagart's remarks are at all intended to apply to that difficulty. It is of course obvious that there is an immense difference, not only between the highest exercise of reason in the brute and the same in man, but between the lowest and the highest operations of reason in any highly intellectual human creature: and this has led to the desire and the effort, in more than one powerful and metaphysical thinker, to restrict the use of the word Reason to those of man's intellectual powers capable of the highest exercise, proposing to designate the other and lower by the term Understanding. In this sense they deny that brutes have Reason at all; and, admitting that they have understanding, yet do not admit even this in the same sense in which they speak of the human understanding, but allege that the brute understanding is a merely instinctive understanding, or a necessary development of the powers of Instinct under certain contingent laws, but determinable by the nature and habits of the animal itself. While holding different views on this latter point—and I shall presently seek to show the grounds of my dissent—I am ready most freely to admit that it is highly desirable to assert the vast distinction between what they severally designate as Reason and as Understanding: yet, as it appears to me, there are peculiar difficulties in the way of attempting to do so by the appropriation of the word Reason to man's highest intellectual power; one of which is this, that while we should have two nouns, Reason and Understanding, standing for things very widely distinct, we should have but the one verb, 'to reason,' to denote the distinct action of each of the essences designated; and not only so, but that this verb would be fully as appropriate when applied in connexion with that noun to which it is not paronymous, nor indeed even homologous, as when used in connexion with its conjugate; so that if we wished to speak of the exercise, by the brute animals, of the intellectual faculties they are admitted to possess, while, by what we may term verbal necessity, we should have to say that they are able to reason and often do reason, we must yet by the definition deny to them any possession of the faculty of Reason. This difficulty is more clearly seen by a reference to the definitions these writers give of Reason and Understanding, which they assert to be "distinct in kind." The latter, they say, is "the faculty judging (that judges) according to sense" (Coleridge, 'Aids to Reflection,' i. 168); the former, "the power of universal and necessary convictions; the source and substance of truths above sense, and having their evidence in themselves;" or, "the source of necessary and universal principles, according to

which the notices of the senses are either confirmed or denied." (*Id.* i. 181). And there is this further difficulty, that the immense majority of mankind will, according to the strict definition, be cut off from all but a nominal possession and exercise of Reason. For my own part, therefore, I should be disposed, in preference, to use distinctive terms applied to the word Reason itself; thus, the Higher Reason or Pure Reason (Kirke's 'Physiology,' 452), and the Lower Reason or Natural Reason; which latter, in the words used by Archbishop Leighton and commented on by Coleridge, is the faculty that is said to "judge according to sense." And so I should feel justified in the use—objected to by Mr. Tagart—of such expressions as "the degree or kind of exercise of Reason from its simplest manifestation to its more complicated operation."

Next I proceed to notice the accounts or definitions of Instinct given by these writers. "The word Instinct brings together a number of facts into one class by the assertion of a common ground, the nature of which ground it determines negatively only,—that is, the word does not explain what this common ground is, but simply indicates that there is such a ground, and that it is different in kind from that in which the responsible and consciously voluntary actions of men originate. Thus, in its true and primary import, Instinct stands in antithesis to Reason; and the perplexity and contradictory statements, into which so many meritorious naturalists and popular writers on Natural History have fallen on this subject, arise wholly from their taking the word in opposition to Understanding."—('Aids,' i. 190, note.) This passage is extracted from a note appended to a series of remarks on a portion of a Lecture delivered at the Royal College of Surgeons, by Mr. Green, Professor of Anatomy. "In explaining the nature of instinct," Mr. Coleridge says, "as deduced from the actions and tendencies of animals successively presented to the observation of the comparative physiologist in the ascending scale of organic life—or rather, I should have said, in an attempt to determine that precise import of the term which is required by the facts—the Professor explained the nature of what I have elsewhere called the adaptive power, that is, the faculty of adapting means to a proximate end,—I mean here a relative end,—that which relatively to one thing is an end, though relatively to some other it is in itself a mean. . . . I give as the generic definition of adaptive power, the power of selecting and adapting means to proximate ends; and, as an instance of the lowest *species* of this *genus*, I take the stomach of a caterpillar: I ask myself under what words I can generalize the action of this organ,

and I see that it selects and adapts the appropriate means (that is, the assimilable part of the vegetable *congesta*) to the proximate end, that is, the growth or reproduction of the insect's body. This we call vital power, or *vita propria* of the stomach, and this being the lowest *species* its definition is the same with the definition of the kind. Well! from the power of the stomach I pass to the power exerted by the whole animal: I trace it wandering from spot to spot, and plant to plant, till it finds the appropriate vegetable; and again, on this chosen vegetable, I mark it seeking out and fixing on the part of the plant—bark, leaf or petal—suited to its nourishment; or (should the animal have assumed the butterfly form) to the deposition of its eggs and the sustentation of the future *larva*. Here I see a power of selecting and adapting means to proximate ends, according to circumstances; and this higher species of adaptive power we call Instinct. Lastly, I reflect on the facts narrated and described in the preceding extracts from Hüber" (of bees supporting a tottering piece of comb until effectually propped by pillars of wax, and ants constructing a passage or tunnel to an under-ground chamber), "and see a power of selecting and adapting the proper means to the proximate ends, according to varying circumstances. And what shall we call this yet higher species? We name the former Instinct; we must call this Instinctive Intelligence. Here then we have three powers of the same kind, life, instinct, and instinctive intelligence; the essential characters that define the *genus* existing equally in all three." I pause here for a moment, to ask, if this be so, ought not these three powers to be severally termed Organic or Vegetative Instinct, Animal Instinct, and Intelligent Instinct, rather than Life, Instinct, and Instinctive Intelligence? The author continues, "But in addition to these, I find one other character common to the highest and lowest, viz. that *the purposes are all manifestly predetermined by the peculiar organization of the animals;* and though it may not be possible to discover any such immediate dependency in all the actions, yet the actions being determined by the purposes, the result is equivalent; and *both the actions and the purposes are all in a necessitated reference to the preservation and continuation of the particular animal or the progeny.*"—(*Id.* i. 190, 192.)

I have not space for lengthened comments on the foregoing, but I must demur to the statements in the italicised portions. I do not think that, as to very many recorded instances of brute intelligence, these statements can be made with truth. They are not true as applied to several of the few instances I adduced in my former paper on

this subject; and, what is remarkable, the author, in effect, goes on in the succeeding paragraph, to say there are many recorded actions of animals which cannot be consistently set down under the category he proposes, viz. the "extraordinary" but "numerous and well-authenticated actions of dogs for the preservation of their masters' lives, and even for the avenging of their deaths. In these instances we have the third *species* of the adaptive power in connexion with an apparently moral end—with an end in the proper sense of the word. Here the adaptive power co-exists with a purpose apparently voluntary, and the action seems neither predetermined by the organization of the animal, nor in the direct reference to his own preservation, nor to the continuance of his race. . . . This, I admit, is a problem of which I have no solution to offer."—(*Id.* i. 195). This problem or difficulty, it certainly does seem, arises simply from, so to speak, stretching Instinct until it ceases to be instinctive and becomes rational. As Professor Green says, after speaking of Hüber's Bees (*Id.* ii. 9), "Here we are puzzled; for this becomes understanding." It *is* a puzzle, and the thing referred to *is* understanding. But the puzzle is avoided (though not in Professor Green's way), and the problem ceases to be a problem by letting Instinct be what its derivation makes it and our definitions describe it as being, and by letting whatever else in the list of an animal's actions there may be, which cannot be bounded and delineated by those definitions, be termed rational or intelligent, or described as due to Reason—albeit to Reason, as we are ready to admit—in its lower sense or degree. At all events this seems to be better and more consistent, with both fact and reason, than the conclusion adopted by Professor Green, that "though instinct is not the same and identical with the human understanding, the difference is not in the essential of the definition, but in an addition to or modification of that which is essentially the same in both:" or, as it stands in Coleridge's words, "that if I suppose the adaptive power in its highest *species*, or form of instinctive intelligence, to co-exist with reason, free will and self-consciousness, it instantly becomes understanding; in other words, that understanding differs indeed from the noblest form of instinct, but not in itself or in its own essential properties, but in consequence of its co-existence with far higher powers of a diverse kind in one and the same subject. Instinct in a rational, responsible and self-conscious animal, is understanding."

It scarcely would seem to me that the doctrine that man is moved or influenced by Instinct, that he is a participant in Instinct, or in the possession of Instinct, is one which calls for elaborate proof; or that

the language which speaks of him as a creature of Instinct, or of his instinctive qualities or processes, or of his various instincts,—except in so far as this latter expression is open to the emendation admitted above,—calls for systematic defence, except on the ground that Mr. Tagart "objects" to both the one and the other: but having to maintain that doctrine, and being inclined to adopt this language, I should be disposed to distinguish carefully between mere desires and true Instincts or operations of Instinct.

To make one more special reference to Mr. Tagart's paper. He writes (Zool. 5743), "Say, if you please, with Sir B. Brodie, that 'the desire to live in society is as much an instinct in man as it is in the bee, the ant, the beaver, or the prairie-dog;'* but it is no more so. It is no more an instinct than any other desire, than all desire, the desire to sit, lie or sleep when weary, to eat when hungry, to drink when thirsty, to have more clothes or get nearer fire when cold: it is no more than saying that man is the creature of desire, or subject to desire, like all other animated beings. . . . Is there anything special in the desire to live in society to make it more than any other desires worthy the name of an instinct?" The answer to this question—and it is strange a logician did not foresee it—is only too easy after the admission in the first period of the passage just quoted. If the desire to live in society is as much an instinct in man as it is in any of the creatures named,—and it needs not to be more so,—there *is* something "special" in that desire to "make it worthy to be called an instinct;" and that something is this,—that it is not a mere simple *desire* in the case of either of the creatures named, or of any other of the social or gregarious animals. It is much more: it is a necessity; a desire or impulse which they cannot resist, which they most certainly never attempt to resist: in other words, it is "a determination given

* I append Sir B. Brodie's definition of Instinct. "Instinct is a principle by which animals are induced, independently of experience and reasoning, to the performance of certain voluntary acts, which are necessary to their preservation as individuals, or the continuance of the species, or in some other way convenient to them." —*Psych. Researches*, 187. And I add the following extract that the passage criticized by Mr. Tagart may be seen in connexion with its context. "Man could not exist as a solitary being. He has neither swiftness of feet nor any natural means of offence and defence, which would enable him to compete with the buffalo, the lion or the wolf. It would have been of little avail to him if the Creator had left it to himself to learn, by hard experience and any wisdom of his own, that he can procure his own safety and his means of subsistence only by associating with others. The desire to live in society is as much an instinct in him," &c.—*Id.* 196.

by Almighty Wisdom to act" in this particular manner, and no other: that is Instinct, or an impulse of Instinct.*

However, it is neither my wish nor intention to found much on an argument which, in a measure, may be said to be derived from an unwary admission. If man ever acts under or in obedience to the impulses of Instinct, a little careful observation and thought will, without doubt, soon render it apparent to any reasonable and candid person that the case is so. Now I think that the action of the infant, alleged as an illustration of instinctive actions in our definitions above given, is one which admits of no question as to its origin. No one would ever think of denying that the young animal of any other species save the human seeks its mother's dug by Instinct; and it is simply preposterous to set up a distinction between the act of sucking as done by a human infant and the same act as done by an infant brute. And be it observed that it is not a simple desire in this case: the desire of food may be felt, but it is something beyond the simple desire which prompts the seizure of the pap by the lips and all the complicated proceedings which constitute the act of sucking, as it is something beyond a simple desire which urges the just-hatched duckling into the water and prompts all the complicated proceedings which constitute the act of swimming. What the simple desire of food prompts to, as far as I have seen, is squalling in the infant and squeaking in the small pig.

Again, who doubts that if a male and female infant were thrown together on an otherwise uninhabited island, and, by a strange combination of circumstances,—neither unimaginable, however, nor unimagined,—were to arrive at years of puberty, there would be a continuation of the human species in that island? Indeed I may distinctly state that I am in possession of facts relative to both sexes which establish, beyond all dispute, the existence of the sexual instinct—I repeat instinct, and not desire, the existence of which needs not to be established—in the human species.

Further, I might quote a hundred different instances in which animals,—the cat, the dog, the pig, the donkey, the cow,—having been transported to a distance (in some cases by the agency of their own limbs, in other cases in baskets, sacks, carriages, ships) from their accustomed place of habitation, have, on finding themselves at liberty, returned to their former home; very possibly taking long, toilsome

* "The child is led to seek the society of other children, *by an impulse which he cannot resist*, and which is independent of any intellectual operation."—*Brodie*, 197.

journeys, and, in several cases, such as required other means of locomotion besides the animal's own for their accomplishment, before the return could be effected. No one disputes that this is done by Instinct, and indeed no one can, for there is no other explanation to be given. It is very wonderful and mysterious, but possibly not at all more so than what we see or may see almost every day, in a hundred different directions, if we have our eyes open. I refer to such things as the migration of various birds and beasts, the return of the bee to its hive,* and the like.

Well! we go into the vast forests of North America, equally boundless, trackless, directionless: but the Red Man † will guide us to a point in any given direction, though he has never been there before; and, if we take him by a circuitous route to any given point, scores of miles distant, and never before visited by him, he will return

* In this moorland country it is customary, when the ling (Scottice, heather) is in bloom, for the keepers of bees to convey their hives to the close vicinity of the moors. You may sometimes see thirty or forty hives placed in some little enclosure connected with a cottage or other house just on the verge of the moor. This transportation, I hardly need say, is effected after nightfall, and the bees have "gone to bed." The next morning, after a little seeming "wonder where they have got to," they go about their business as usual, amid the new scenes and flowers and sweets,—and very powerful and delicious is the aromatic smell of the ling blossom on a fine sunny day in August,—and at the usual time return well laden, in their customary direct undoubting flight, to their comb, notwithstanding its new "whereabouts." The honey, I may add, is almost equal in flavour and scent to the renowned honey of Greece.

† "It is truly wonderful to witness the sagacity and unerring precision with which the Indian hunter can trace his route from one spot to another, no matter how great the distance may be, through the most dense forests, and over the most rough and broken country. It does not signify whether he has travelled through the same country before or not; he knows the direction, and that is sufficient. In his native forests he is never at a loss; walks evenly and softly at all times, as if he were on the trail; seldom speaks or makes a false step, or unintentionally breaks a branch."—*Hardy's Sporting Adventures in the New World*, i. 32. I quote from this book as it happens to be the volume at hand, but the facts adduced are testified to by many different authors. Again, "Many are the rules which I have heard laid down by white settlers for finding one's way through the woods." The writer then mentions two or three, such as noticing the bark on the trees, and being "guided by the mosses and lichens, which always grow thickest on the north side," or observing the "direction in which the top foliage of pines and the hackmatack grows: they will invariably be found pointing to the north-east," &c. &c. He then proceeds, "I have heard all these methods described as being resorted to by the Indians in finding their way, but I am confident that they do not use them. When I have mentioned them to an Indian, he has invariably laughed heartily, saying, 'Ingine no want look at bark or tree-top, 'cept when he hunt porcupine.'"—*Id.* 33, 35.

by the chord of the arc, and without a hesitation or a deviation; and moreover I believe that in his case "it is" NOT "the peculiarity of man not only to be conscious of the ends which he pursues and of the methods by which he attains them, but to be able as well to give an account of these ends and means, *so as to instruct his fellows.*" (Zool. 5743.) It is said that he can give no explanation of the remarkable power of self-guidance he so unquestionably possesses. And it may be added, multitudes of instances, more or less analogous to this, from the habits and peculiarities of the Australian natives and other uncivilized or savage races, might be adduced. Will any one hesitate in affirming that Instinct—simple untutored Instinct—is the motive power and influential cause in all such cases as the one alleged?

The instances which have been thus brought forward are instances of pure, simple Instinct, as operative in the human species; two of them illustrated in the experience of, it may be said, every individual in the species, the third only confined to the experience of the savage. And besides, it would be easy to adduce other instances, to almost any extent, as to which it would be very difficult to make good a negative to the question, Are not all these actions due *originally* to Instinct, however much that Instinct may have been restrained, directed, overruled, in its operation by Reason? and this, too, quite independently of all those many actions in every human creature's daily career of doing, which may be ascribed to what Mr. Couch describes as unconscious irritability; such, for instance, as the involuntary closing of the eye-lid at the sudden approach to the eye of any material object, and the like:* but the production of such instances is quite unnecessary for our purpose. Quite enough has been said to justify what my critic "objects to," *viz.* "the application of the term Instinct to man;" and, moreover, I shall have to revert to the subject in a future portion of the present paper.

J. C. ATKINSON.

Danby Parsonage, Grosmont, York,
March, 1858.

* Dr. Carpenter terms such actions Consensual.

Notes on the Hedgehog. By Major Spicer.

The following notes on the hedgehog may perhaps interest some of the readers of the 'Zoologist:'—

Saturday, July 8th. I this morning found a hedgehog, and with her four young ones, about the size of small oranges: I took them home, and placed them in the kitchen garden, the old one and young, making a sort of nest for them amongst some herbs. The old one soon seemed to recover her fright and hurts, for she had been much worried by a couple of terriers I had with me, till I discovered she had young ones with her, when I made them desist. I make a practice of killing all hedgehogs as vermin, being confident of their malpractices with regard to game. On visiting them the same afternoon I found the old one suckling her young, and I stood quietly by watching her for some time: she lay at full length on her side, or rather nearly on her back, for their convenience, just like an old sow with pigs in a sty, and the young ones worked away at her paps, smacking their lips, and making almost as much noise about it as young pigs would do: their cry when not suckling is a sort of continuous short whistle or chirp, like the cry of a bullfinch, and more like a small bird than an animal.

July 9. They were all in the same place, in the nest I had made for them: in the path near I had strewn, the night before, little bits of raw meat, and some of this was gone, but whether stolen by birds or eaten by the hedgehog or other vermin I could not say.

July 10. On looking at them in the morning the old one was not to be found, but the young ones were all right, and looking as snug as could be. On searching for the old one, I found a hole scratched under the garden fence, a wooden close paling, about ten yards from where the young ones were.

July 11. The old hedgehog still away, but the young ones looking well and sleeping contentedly, so that no doubt she returned in the night to suckle them, whereas had they been deserted and hungry they would have been restless and half-starved in the two nights. To ascertain whether she returned, I closed the hole under the fence loosely with earth.

July 12. The hole scratched open from the outside, and the young hedgehogs strong and well, but no old one to be found; she evidently returned to suckle them each night, and they lay sleeping as comfortably and as full as young sucking-pigs or puppies.

July 13. This morning three of the four young ones are gone, and

the remaining one was baking in the sun in the centre of a broad gravel-path, which lay between the nest and the hole under the fence, the mother having evidently managed to carry off three, but, disturbed in her journey with the last, probably daylight overtaking her before she calculated. I returned it to its nest or hiding-place to see the result.

July 14. The remaining young one is gone, no doubt carried off by the old hedgehog.

The sequel is soon told: some few days afterwards my neighbour, a farmer, told me, as a remarkable circumstance, that a few mornings before, he and one of his men, about five o'clock, saw a large hedgehog, in his meadow adjoining mine, carrying a young one in its mouth from the direction of my garden. Between my meadow, which adjoined the garden and his, was a high bank and ditch, which she had therefore passed, and altogether she was, when seen by him, 100 yards from the garden fence: this was no doubt my hedgehog, in whom I had at last taken quite an interest: they watched her for some time, carrying the young one a "smartish way," as they called it, through the thick grass heavy with dew; every now and then she put the young one down and rested, and this she did many times, setting to work again at her task, and so interested was she in what she was doing that she took no notice of them, though close to her. She carried the young one in her mouth, having hold of it by the back of the neck, and her strength was such that she lifted it usually quite off the ground, and trotted rather than walked with it. I am sorry to say they ended by destroying them both.

This poor hedgehog had each night to feed herself, travel from her own hiding-place to her young, suckle them all, and lastly to transport them singly away to a place of safety; thus making three or four long journeys on the night she took them away, the nights being very short at this season of the year.

This is the amiable part of their character; but I must, from long experience of their habits, give but a very indifferent account of them as friends to the game preserver, though it was long before I would yield to the popular clamour against them. While on the subject of this hedgehog and her young ones, I will mention that, late on the evening that I had strewed the pieces of raw meat for her in the pathway, I found a large black slug feasting on a piece of raw mutton: there was no mistake about it, as I watched him for some time, and he stuck to it like a leech; I had no notion that these gentlemen were

carnivorous, though it has struck me since that I have found slugs about garbage and dead animals.

A friend of mine, a good sportsman and close observer, has told me the following with regard to the hedgehog. He was one day passing under a rookery, and was attracted by a young rook on the ground, having fallen from its nest before it could fly, which was making a great noise, squalling most lustily, and on reaching the spot he found a hedgehog had got hold of him, having seized him by the back, and was mouthing and worrying him, and would no doubt soon have finished him had he not rescued him and destroyed the hedgehog. This anecdote seems to me to set at rest the long arguments *pro* and *con* which I have read, in the 'Zoologist' and elsewhere, as to whether hedgehogs are destructive to game or not: this was not an animal in confinement, debarred from his natural food, but, with all the world before him, he had chosen a fat young rook as a dainty morsel. I have over and over again caught them in traps baited with some dead animal, and set for vermin, and used to try and persuade myself that they had got there by accident, but I have since had too many proofs of their delinquencies.

The same person to whom I am indebted for the above also narrates the following. He found a hedgehog in a meadow, and to kill it he kicked it several times, when it uttered a cry, as he says, resembling a calf; so much so, that some cows in the meadow, who had before taken no notice of him or his proceedings, immediately came up and bellowed round him, and he fully thinks that they imagined he had a calf in some way near him, and he says that the cry, had he not known whence it proceeded, would have deceived him. Now possibly this will be ridiculed, and the peculiar tone emitted by the hedgehog may have been accidental; but there is no doubt of the fact, as my friend is by no means an imaginative person, but a very matter-of-fact one. Supposing the cry at that time to have been the natural cry of the hedgehog, has he the power of uttering it at pleasure, or are the strenuous kicks of my friend required to bring it forth? And can it be connected in any way with the old notion of their sucking cows? as, if they can make the cry at will, it would very much facilitate the operation. It is extraordinary how deep-rooted a prejudice this still is in the minds of country people, if prejudice it is: I confess I do not see the great improbability of it. The hedgehog has the power of stretching its neck a long way out from its body, as anybody who watches them running about of a summer's evening may remark for themselves, and we know how

willing a cow is to be relieved of her burden of milk; indeed it is a most pleasurable sensation to her, and if, in addition, the hedgehog has the power of imitating the cry of a calf, it might induce a cow, when lying down, to bear a little punishment from its prickles for the pleasure of having her milk drawn from her. The hedgehog's fondness for milk is very certain, as I have constantly kept them on bread and milk, and they would refuse every other sort of food for it. However the case may be, it is very generally believed by the lower orders of the South of England.

Like other animals and birds, hedgehogs are occasionally albinos: I have a very large one stuffed, which is perfectly white, the hair of the lower part and legs, as well as the prickles of the back. The very young ones are always light-coloured.

JOHN SPICER.

Fowley, Liphook, Hants,
April 7, 1858.

Note on the early breeding of Squirrels.—On the 4th of March several squirrels, so young that they were not much bigger than a rat, and scarcely fit to leave the nest, were running about upon the snow. It is a fable, which I had believed until I came here, that squirrels hybernate; here their footsteps are the first which mark the unsullied beauty of the snow.—*W. C. Hewitson; Oatlands, April* 10, 1858.

Occurrence of the Peregrine Falcon in Yorkshire.—A fine specimen of this bird was caught by a boy in a grass field at Thorne, on the 8th of February last, the bird having been shot at, but only winged, and is now in the possession of George Glennie, bird-stuffer.—*Joseph Richardson; Thorne.*

Early appearance of the Hobby in Norfolk.—A female hobby, in good plumage, was shot near this city on the 20th of March. This bird had evidently been fired at before, a portion of both mandibles having been broken, accounting for the sluggishness and lean condition of the unfortunate bird. On dissection, a pellet of feathers was found ready for excretion, showing that, even in its crippled condition, this hawk had succeeded in procuring a meal not long before. I have recorded this instance, as the hobby, a summer visitor to this country, almost invariably visits Norfolk in June; indeed, with the exception of one killed some years back, near Yarmouth, in February, I have never known one to appear earlier than the first week of that month.—*H. Stevenson; Norwich, April* 12, 1858.

Early arrival of the Blackcap.—On the 29th of March I heard the blackcap singing, ten days earlier than I ever heard it before.—*W. C. Hewitson; Oatlands, April* 10, 1858.

Early nesting of the Longtailed Titmouse.—On the 18th of March, last year, I traced some longtailed titmice to their nest by watching them carrying large white feathers from a neighbouring farm-house: it was in a bush of furze,—a situation which they seem to prefer,—and in a few days later the bird was sitting on its eggs. I have usually found the nest in June, and was therefore surprised to see it thus early.—*Id.*

Does the Male Partridge assist in Incubation.—I am not able to give the result of personal observation in reply to Major Spicer's inquiry (Zool. 6014), as to whether the male partridge assists the hen in the work of incubation; but I have a note, written in 1839, recording certain of the actions of a male partridge, and with that note is connected a distinct recollection that the observers added to the information recorded a further statement that the male bird did regularly take a part in covering the eggs, in the absence of his mate. The observers were the then rector of Great Braxted, in Essex, and a young man who lived with him; the latter having many opportunities, and using them, of making himself acquainted with the habits of the partridge and other game birds. The actions I adverted to were as follows: the partridge's nest was in the hedge of the pasture in front of the rectory, and during the time of incubation a rabbit very frequently came out to feed nearer the nest than the partridge approved: whenever this happened the male bird attacked the intruder with the partridge's equivalent to "tooth and nail," and always succeeded in driving him to a more respectful distance. I have no doubt that my friends were quite correct as to the sex of the champion, and the fact certainly proves that the male was in the close vicinity of the nest whenever the approach of the rabbit called for a display of his prowess, in defence of his wife *in esse* and children *in posse.*—*J. C. Atkinson; Danby, April* 3, 1858.

Supposed Variety of the Partridge.—With regard to the supposed variety of the partridge spoken of in the Rev. Mr. Atkinson's interesting and most valuable paper (Zool. 5982, at the bottom of the page), I can only say that, thirty years ago, we used to kill the variety spoken of, on Hindhead, and have always called them "little black heath-birds." They differ most essentially from the usual appearance of our birds, almost enough to be taken for another species. They are fully a third smaller in size, invariably of a blacker colour, and never frequent cultivated land; they feed on the tops of the heath, and, in the season, on the ripe fruit of the whortleberry, which is so abundant on Hindhead, and always called "hurts" by the country people. I have no doubt their dark colour is due, in some measure, to this food. One day I killed seven brace and a half of these little black fellows, all exactly alike, and full three miles from the nearest cultivated land.—*Waring Kidd; Ockford Road, Godalming; April* 13, 1858.

Occurrence of the Little Bustard at Gorleston, Suffolk.—About the 4th of March a female little bustard was shot in the Southdown Marshes, at Gorleston, near Yarmouth, and is now in the possession of J. H. Gurney, Esq., M.P. This bird was in fine condition, the stomach being filled with various kinds of green food; the ovaries, about the size of small pins' heads, were easily distinguishable, from their being perfectly white; the wind at the time this bird was killed, and for some days previously, was N.E.; the weather intensely cold, with snow on the ground; in fact, exactly such as we experienced in December, 1853, when the last Norfolk specimen (a male, in winter plumage) was obtained in nearly the same neighbourhood (Zool. 4253): at that time several other specimens were recorded as having occurred in various counties about

the same date. It may not be uninteresting, in the case of so accidental a visitant to our coast, to enumerate, as far as possible, the portions of herbs and grasses which formed the contents of the stomach in this last instance. By far the larger portion consisted of a long fine grass, apparently from the marshes, having a brackish odour; and mixed with this, and matted together, was a species of Conferva from the ditches; two flowers of the common daisy (*Bellis perennis*) were plainly discernible, as also a narrow scolloped leaf, resembling cat's ear (*Hypochæris glabra*); besides these a small fragment of some thistle and a portion of the water ranunculus (*Ranunculus aquatilis*) were all that could be identified.—*H. Stevenson; Norwich, March* 16, 1858.

Notes on Scottish Lepidoptera in 1855-6.* By R. F. Logan, Esq.

The communication I have to-night to lay before the Society is, as its title imports, rather a collection of scattered notes than a regular paper. I shall first enumerate a few insects which were added, during the years 1855 and 1856, to the list of species occurring around Edinburgh; principally by the industry and energy of the Messrs. Wilson.

The first species on Mr. Wilson's list is Anisopteryx æscularia, of which he obtained a single male specimen from Corstorphine Hill, in the spring of 1855. It is probably frequently overlooked, like many other brumal and vernal species; but does not appear to be common in Scotland.

Eupithecia innotata. Of this scarce species the Messrs Wilson obtained one specimen near Morningside in 1855; and have hitherto been unsuccessful in their attempts to find more. The Rev. Joseph Greene, in a recent number of the 'Zoologist,' states, that he believes the food of the larva to be the ash (*Fraxinus excelsior*); and this is still further confirmed by Mr. Crewe, who states, in the 'Naturalist,' that he has taken it from that tree. Knoch, however, as quoted by Treitschke, says, that it feeds on the various species of wormwood (*Artemisia Absinthium, vulgaris* and *campestris*), living on the blossoms in the month of August, and varying in colour from green to brown.

The curious little Noctua, Euplexia lucipara, although known to occur in other parts of Scotland, had not apparently been observed near Edinburgh till the summer of 1855, when Mr. Wilson obtained a specimen on Corstorphine Hill; and I afterwards found several, in

* Read before the Royal Physical Society of Edinburgh.

the larva state, on the Pentlands, in October, feeding on the common fern or braken (*Pteris aquilina*). These larvæ formed loose cocoons just under the surface of the earth, and produced the perfect insects in June, 1856.

In June and July, 1855, Dianthæcia conspersa was observed by the Messrs. Wilson, at Slateford and Currie, in which localities they afterwards found the larvæ in August, feeding on the seeds of Silene inflata, along with those of the rather scarce D. carpophaga. From these larvæ both species were reared in 1856; but those of D. carpophaga are not easily reared in confinement, and but few moths came to perfection. These are very different in colour from English specimens of the same insect, being much darker and less ochraceous in tint, and are no doubt a climatal or geographical variety.

The next species I have to mention is Demas Coryli, of which Mr. Wilson reared one male, from a larva found in the autumn of 1855. During last autumn Mr. Wilson and I found nine or ten more larvæ, so that the species does not seem so rare in the district as we had imagined it to be, although certainly less common than in many other parts of Scotland.

In 1856 the Messrs. Wilson added five species to the list. Lobophora lobulata was found among sallows near Penicuik, in April; and in the same locality, in June, Coremia ferrugata and C. propugnata occurred,—both common insects, but not before observed in the district. Thera variata (*T. coniferata*, Curtis; *T. simulata*, Guenée, Hüb.?) was reared in July, from rather short green larvæ, with white lines, found on juniper on the Pentlands, in June, along with the larvæ of Eupithecia sobrinata; and on the 8th of October I beat a specimen of the perfect insect from one of the juniper bushes, apparently indicating the existence of a second brood in the year, as in Thera simulata. Finally, Mr. Wilson found five or six larvæ of Clostera reclusa on Salix capræa, in Drumshorling Wood, near Broxburn, in the end of August: they were then full grown, and spun their cocoons in a day or two after they were placed in captivity.

Late in October, 1855, when the leaves were rapidly departing from the trees, I found the active, green, fusiform larvæ of Swammerdamia griseo-capitella, in abundance on the dwarf birches at Ravelrig Bog, along with the larvæ of Phlæodes frutetana; and forming circular mines in the birch leaves, somewhat like those made in the leaves of apple and pear trees by the brilliant little Cemiostoma scitella, were a few unknown larvæ of a Nepticula, which produced, in 1856, N. argentipedella, almost at the same time that Mr. Stainton bred the

species from larvæ collected in England by Mr. Wilkinson. At the same time and place, a small larva was found mining in the birch leaves, and finally cutting out an oval case, in which it descended to the ground to complete its transformations. This curious little artificer produced, in June, Tinea bistrigella, an insect already in our list, but of which the transformations were unknown until the larva was detected in the south of England, in 1855, by Mr. Boyd.*

A single specimen of Scoparia pallida was taken in the marsh at the west end of Duddingston Loch, on the 11th of July, 1856; and on the 24th the larvæ of Notodonta ziczac, Hypermecia angustana and Chesias spartiata were found in the vale of the Heriot,—the two former on sallow, the latter on its natural food, the common broom.

The remaining species added during the two past seasons are—Gracilaria elongella, which is not scarce in many places during the autumn, and must feed on other trees besides the alder; Lithocolletis Scopariella, taken at Heriot, in July, among broom; Nepticula —— ? reared from mountain-ash, in the spring; N. anomalella, mining in the leaves of the China rose (*Rosa indica*), at Duddingston, and previously taken at Balgreen; and lastly, the old mines of Nepticula Tityrella have been detected this year, by Mr. Shield, in the leaves of a beech hedge, between Threipmuir and Balerno.

Early in May, 1856, I bred three specimens of Eupithecia helveticaria of Boisduval, from green larvæ found on the common juniper, on the Pentlands, in the autumn of 1855. I had met with the insect in former years, and suspected it might prove to be a new species. It was not until Mr. Doubleday sent specimens to M. Guenée, and thus ascertained that it was already named on the Continent, that I discovered I had overlooked Boisduval's description of the insect, which he says was bred by Herr Anderregg, in Switzerland, from larvæ found on Juniperus Sabina. The Messrs. Wilson found several of the larvæ on the Pentlands last autumn, some of which, from being kept in the house, produced the perfect insects in the month of February.

Another very interesting species of the genus Eupithecia was found in some numbers by the Messrs. Wilson, although it is not new to the district, having been taken near Edinburgh many years ago by Mr. Curtis; and one of its apparent varieties, on several occasions of late years, by Dr. Lowe and myself. I allude to the large and hand-

* I have some slight doubts as to whether the larvæ found by Mr. Boyd are identical with those above mentioned.

some Eupithecia cognata. Having fortunately obtained the eggs of E. subfulvata,* from a worn specimen captured at Duddingston, at the same time that Mr. Wilson kindly furnished me with those of E. cognata, I have no hesitation in saying, from the results of a careful comparison of the larvæ in all their stages, that they are the same species, and feed on the same plant, the common yarrow (*Achillea Millefolium*). With regard to the other supposed variety, E. succenturiata, I can say nothing, as I have not seen the larva, which is said to feed on the seeds and flowers of Artemisia maritima. Should it prove to be the same species, the last mentioned, being Linneus's name, must be retained for the insect.

In August and September many larvæ of Eupithecia assimilata were found at Duddingston, on black currant (*Ribes nigrum*). The insect stands already in our list, and had been bred by Mr. Wilson, under the name of E. minutata; but the latter species is said to feed upon heath, and to frequent uncultivated localities, while the former is always found in gardens.

During the autumn of 1855 I received a few eggs of Coremia olivata from the neighbourhood of Loch Rannoch: they hatched shortly after I received them, and the young larvæ fed on the different species of Galium, passing the winter without feeding, and commencing again early in the spring. The full-grown larvæ were dingy brown in colour and remarkably hispid, bearing no resemblance to Réaumur's "*Arpenteuse qui vit de feuilles du frêne.*" About the same time Mr. Wilson obtained the larvæ of Coremia munitata from the egg, but only one survived the winter: it resembled very closely the larva of C. montanata.

Having likewise received fertile eggs of Erebia blandina from Rannoch, I placed the young larvæ in a glass cylinder, having the upper end covered with a piece of muslin, and the lower end placed in a flower-pot containing several species of growing grasses, and exposed the whole to the weather in the garden. Here I had the satisfaction to perceive that the young larvæ throve apace, and before the hard weather set in they were about three lines in length, of the usual form peculiar to the Satyridi; and when resting, as they generally did, near the roots of the grasses, they resembled the withered sheaths so closely as to be almost undistinguishable. In this position five of them survived the winter, but the last of these died on the 19th May, 1856; and I have been still more unsuccessful in a second attempt,

* See 'Zoologist' for 1857, p. 5719.

which I was enabled to make last autumn through the kindness of the Messrs. Wilson.

In April, 1856, I received, from Perthshire, eggs of Petasia nubeculosa, Brephos Parthenias and Semioscopis Avellanella—all very interesting species to the systematic entomologist, from the positions they appear to occupy on the limits of the respective tribes to which they belong, each apparently possessing the characters of two of the principal divisions of the Heterocerous Lepidoptera. These involved affinities are fully borne out by the characters of the ova, which have been too much neglected as an aid to classification. Thus, the eggs of the Petasia are spherical and ribbed, like those of the Noctuina; and the young larva, when first disclosed, arches the central segments slightly in walking, like nearly all the larvæ of the Noctuina, before their second moult. The eggs of Brephos Parthenias, which Guenée places at the end of his first section of the Noctuina, are oblong-oval, smooth, and resemble the eggs of most of the Geometrina; while those of Semioscopis Avellanella are flat and scale-like, indicating a close affinity with the Tortricina. The young larvæ of Petasia nubeculosa were disclosed from the egg about the middle of May, and were then bluish-gray, with small dark tubercles and an amber-coloured head. They were very restless at first, and it was some time before they commenced to feed. They changed their first skin in about fourteen days, spinning a silken carpet on the leaf, in which they fastened their prolegs for security of position, and then appeared of a pale green, with three whitish lines, minute black tubercles, and translucent green head; the thoracic feet and a spot upon each of the prolegs black. They still looped slightly in walking, resting solitarily on the under sides of the birch leaves, with their heads stiffly recurved, like the larva of Endromis versicolor, and dropping, when suddenly alarmed, by a silken thread, which they used for the purpose of regaining their position when the supposed danger was over. In disposition they were most pugnacious and irritable, hitting and biting each other whenever they came in contact, and wandering restlessly about when disturbed. In consequence of these habits, several of them died from the wounds they received from their companions. The second moult was completed in eleven or twelve days, when the black tubercles became pale whitish yellow. After the third moult, which was again accomplished on the fourteenth day, the young larvæ were pale yellowish green, the hair-warts sulphur-yellow; an oblique lateral streak on the fourth segment, and a transverse bar on the twelfth segment, of the same colour; head unicolorous green; tho-

racic feet and a spot on each of the prolegs black. After this they did not appear to alter much in the succeeding moults, and I was prevented from completing my observations upon these interesting larvæ by the demise of the last one, before it was full grown; but some of the English entomologists were more successful, and, I believe, obtained the pupæ. R. F. Logan.

Geographical Distribution of British Butterflies.—The paper on this subject by Messrs. Boyd and More, at p. 6018 of the 'Zoologist,' is one of those careful and thoughtful papers which give me the greatest pleasure to receive and publish: it has, however, suggested a few doubts in my mind, the solution of which will, I am sure, be as interesting to my readers as to myself. In the first place, I feel a strong repugnance to adopting any theory of geographical distribution of insects that does not recognise as a primary postulate the abundant presence of suitable food, and, as a secondary postulate, suitable conditions of climate, whether as regards heat or moisture: thus, as a familiar illustration, I suppose that Brassicæ and Rapæ swarm in our London gardens, first, because we provide them so abundantly with suitable food, and, secondly, because they find the temperature of the London atmosphere conducive to their well being and increase. I cannot imagine that the clouds of white butterflies I sometimes see opposite my window are the descendants of a colony settled there some hundreds of thousands of years ago, but that they are attracted simply by the rows of cabbages, and I arrive at this conclusion because when the field is occupied by a crop that the white butterflies do not seek, I do not see them there. Again, for several years we had lucerne near us, and the field produced an abundant crop of Polyommatus Alexis, but now mangold wurzel has succeeded the lucerne, and Alexis has deserted us: surely in our theories we should allow margin for such obvious causes of the presence or absence of species. I may also observe that any conclusions drawn from data so obviously imperfect as those to which Messrs. Boyd and More have had access, while they aim at rigid truth, may convey a totally false impression. Thus I think that working entomologists would agree with me that the gloriously varied "Province" of "South Wales" was likely to prove the richest in butterflies of all the eighteen, and "Ouse," on account of its monotonous surface, to prove the poorest, but we find that the butterflies of "South Wales" stand at 0, those of Ouse at 59. In both instances the facts of the case are misstated, simply because the absence or presence of butterflies is inferred from the absence or presence of entomologists.—*Edward Newman.*

Additions to Messrs. Boyd and More's "Geographical Distribution of Butterflies in Great Britain."—

Anthocaris Cardamines. Area 15. Very plentiful at Fochabers.

Vanessa Antiopa. Area 13. Two specimens taken several years ago on the banks of the canal, not far from Paisley; one of these, a few years ago, was in the possession of a bird-stuffer in George's Street, Edinburgh.

Satyrus Tithonus. Area 11. Taken by myself at Morpeth: I believe it is also plentiful in the neighbourhood of Durham.

Area 6. This is without a single representative. Has no one visited this portion of South Wales who is able to supply any information?—*John Scott; Southfield Villas, Middlesbro'-on-Tees, April* 5, 1858.

Deilephila Euphorbiæ not taken near Bridgewater.—Having seen an erroneous statement that a specimen of D. Euphorbiæ, taken by the late Mr. Baker near Bridgewater, was still in the collection formed by that lamented naturalist, and having an opportunity of tracing the source of the error, by writing to the late Mr. Baker's friend and coadjutor, Mr. Clark, of Halesleigh, I find it is simply a misnomer, the insect in question being Deilephila Galii. Mr. Clark writes thus, "There is no specimen of Deilephila Euphorbiæ in the cabinet of the late William Baker, neither has that cabinet ever contained one; the species is D. Galii, and the similarity of the two species has probably led an incompetent observer into this error. Euphorbia Paralias grows to a great extent among the Burnham Sands, a mile or two northward of the mouth of the river Parrett, and William Baker used to remark to me that that one might expect to find the larva of Euphorbiæ there: we searched, but always in vain. There are two specimens of D. Galii in the late W. B.'s collection, and a third in that of the Taunton Museum: one of William Baker's was bred from a larva found by himself on the southern side of Bridgewater; of the history of the other two I know nothing." I fear that this beautiful insect must now be struck out of the British list, since it appears to have been extinct ever since the late Mr. Raddon's *razzia* among the spurge at Braunton Burrows.—*Edward Newman.*

Capture of Endromis versicolor in Tilgate Forest.—On Thursday, the 8th of April, in company with Messrs. Andrews and Tester, we made an expedition to the birch woods, further up this line, the usual haunt of E. versicolor, taking with us a bred female, which, notwithstanding the comparative dulness of the weather, proved such an attraction that, after plying four nets with great rapidity as long as the rain would allow us, we found we had captured between us 118 specimens, generally in fine condition. Sundry specimens of Brephos Parthenias and Ceropacha flavicornis completed our captures. To spare the trouble of application we had better add that, after supplying the wants of our numerous friends, we shall have no remaining duplicates.—*J. Eardley Hall; William Henry Draper; Keymer, Hurstpierpoint, April* 16, 1858.

[I hear that more than six hundred of this species were taken simultaneously with the above near Brighton.—*E. N.*]

Note on the Breeding of Endromis versicolor.—I succeeded in rearing twenty-eight specimens this year from thirty-six eggs and ten caterpillars, which I obtained last season. I kept the pupæ out of doors, during the winter, in a flower-pot covered with moss.—*J. E. Hall; Keymer, Hurstpierpoint, April* 16, 1858.

Occurrence of Hadena peregrina of Treitschke in the Isle of Wight.—Mr. Bond kindly lent me a Noctua, which he captured last summer on the coast of the Isle of Wight, to send to my friend M. Guenée for examination, and it proves to be, what I supposed it was, the Hadena peregrina of Treitschke. It is a common species along the shores of the Mediterranean Sea, and will probably be found here along the southern coast in those localities which Aporophyla australis inhabits. Mr. Bond's insect is slightly darker in colour than the Continental specimens which I possess.—*Henry Doubleday; Epping, April* 17, 1858.

Larvæ of Tephrosia laricaria.—Mr. Burney has given us most interesting information (Zool. 6029) concerning this previously unknown larva, but I am sure he will excuse my asking him to add how he recognises a larva of which no figure or description exists, indeed which no one had previously seen, and which he has not yet bred, to be that of Tephrosia laricaria? I may mention that I have a decided wish to prove the two species distinct; I neither desire to fuse such pairs of species, as

M. Guenée has done, nor to pooh! pooh! them, as mere relations of analogy, as Mr. Westwood proposes: these opposite conclusions remind me of opinions I have sometimes heard expressed of a very attractive lady, the young deciding that she was quite *passée*, the more mature that she was "ridiculously young;" but these views did not deprive the lady of existence, any more than the conflicting opinions of entomologists annihilate my isomyious pairs.—*Edward Newman.*

Larva of Harpalyce sagittaria.—Under this title Mr. Brown gives (Zool. 6030) a description of a larva reared from the egg; so far this communication is interesting; but how comes the writer to confound the name, which is derived from the beautiful sagittate mark on the fore wing, with the idea that the larva feeds on the Sagittaria? Is there any record or evidence of any kind that this arrow-marked insect feeds on the arrowhead? Such a coincidence would be most astounding. Would it not be well to try the larva of this insect, when again reared from the egg, with the various species of Chenopodium which occur in the neighbourhood where it is found? Will Mr. Bond, to whom Mr. Brown has alluded, obligingly give the readers of the 'Zoologist' what information he possesses on this subject?—*Id.*

Occurrence of Pterophorus Lienigianus in Britain.—In the course of the year 1857 Mr. Harding recorded, in the 'Zoologist' (Zool. 5437), the discovery of a Pterophorus in the following words:—"The larva was feeding on the under side of the leaves of the common wormwood; its presence is easily detected by the white appearance of the leaves; the larva is light green; full fed in June; imago out in July: it is very local, and far from common." Mr. Harding associates with this insect the name of similidactylus, but I cannot find the authority for this name. Mr. Doubleday, who has well examined the specimens, agrees with me that they differ from all our ascertained British species; and Mr. Stainton, having carefully compared it with Zeller's description of Pterophorus Lienigianus, in 'Linnea Entomologica,' vol. vi. p. 380, believes it identical with that species.—*Id.*

Ants'-nest Beetles.—Yesterday I made my first essay at examining an ants' nest for the tenant beetles, and was delighted with the new forms of life and habit revealed to me. I found a nest of Formica rufa, about a small cart-load, and sat myself down to examine it. The occupiers, or at least some of them, were lazily clearing out the entrances, reminding one of the preparations made for his expected guests by the landlord of a Highland hostelry; but I could not see any hexapod lodgers in this hotel: so I boldly thrust in my hands and lifted as much of the nest as I could into a large sheet of white paper. The first thing that surprised me was the heat of the nest, the temperature being very sensibly greater than that of my hands; but I had no leisure to think much about this, for I had to free my hands from the ants, which clung to them tenaciously, yet without biting, and while doing this the strong odour of formic acid was very perceptible. The ants swarmed out of the heap of wooden *débris* which lay in the middle of my paper: I swept them off with a bit of stick, and after repeating the process two or three times I began to move the material before me gently backward and forward, taking up the topmost and largest fragments, and throwing them back on to the nest. By continuing to do this I soon got free of most of the ants and the larger pieces of wood, and among the dusty remainder I saw a little tail curled up, which I knew must belong to a Staph.; so I wetted my finger and brought up the entire animal by *habeas corpus:* it was Leptacinus formicetorum. Presently I saw a speck shining like ore; I raised it from its degraded position, and recognised Dendrophilus pygmæus. Then a browner and smaller brother was visible—the rare Saprinus

piceus, which was being trampled under foot by Thiasophila angulata. I spent nearly an hour over this handful of the nest, which proved the best I examined, and, after three hours took stock and found I had, in all—

Dendrophilus pygmæus	12
Saprinus piceus	4
Leptacinus formicetorum	5
Thiasophila angulata	4
Oxypoda hæmorrhoa	2
Othius ? sp.	1
Trichopteryx ? sp.	1

I hope to go again and get more specimens and species, but I am desirous to put others on the search of the ants' nests in their neighbourhood *now*, because the process is not only more practicable than it will be later in the season, when the ants are more active, but it is probable the beetles are now more centralized than they will be later in the season. Every one will, for his own future chances of success, be glad to replace the materials he takes from the nest, remembering that it is not every nest that is productive of beetles.—*J. W. Douglas; 6, Kingswood Place, Lee; April 3.—From the 'Intelligencer.'*

Ants'-nest Beetles.—"I am sorry to see that England, like France, 'openly preaches and elevates to a doctrine' ants'-nest ravaging. Of course there is a difference between taking a handful and sifting a nest: the teaching, however, is precisely the same, and when it is coupled with such success as yours, and recommended by a person of your entomological *status*, I feel confident the system will be disastrous to the occupants of the nests, both Hymenopterous and Coleopterous. Such examinations of ants' nests as you mention, when done tenderly, at this time of the year, may not produce much mischief, but if often repeated, at a more advanced season, when their different chambers are completed and occupied by larvæ and pupæ in their various stages, requiring various degrees of warmth, how are these conditions to be ensured if the hands of all the Myrmecophilous Coleopterists of the 'Great Babylon' are to be 'boldly thrust' into the nests of their pets, overturning the pillars and divisions of their house, letting in the roof, and putting all in confusion? This is what must occur if done in your style, and with the most gentle hands: what will be the fate of colonies operated upon by 'roughs?' It will be no less than spoliation, and you must be prepared for such scenes to be common, and all nearly equal to the Highgate performance, which must necessarily make Myrmecophilous Coleoptera first 'common,' soon 'rare:' who is there but laments the condition of 'the light loamy bank?' Now this is no fault of one or two persons, but the fault of a system, and I very much regret that you should have identified yourself with a system you may feel to be harmless, but which I think will soon prove otherwise." The foregoing is an extract from a letter I have received from a well-known collector, and as every subject is better for being seen on both sides, I have requested and received the writer's permission to publish his remarks. I am the last person to advocate the wanton destruction of any creatures, and in this case the disastrous consequences of the "system," I cannot but think, are greatly overstated, for I have seen nests of Formica rufa thoroughly and repeatedly stirred up by boys, and yet the ants flourished afterwards as much as ever. It is so clearly the interest of the collector not to destroy the nests, that I think no one will do that which will produce such an effect, but even if, regardless of consequences, any one were willing to exterminate the ants, I doubt if they would let him, so pertinacious and formidable are their

attacks directly the weather gets warm. The solicitude recently evinced for the welfare of ants seems to me to be very singular. Water-beetles are taken out of their element by hundreds, moths are attracted to sugar and sacrificed by thousands, nay, whole broods of caterpillars are reared from the eggs, only that they may furnish "fine specimens" for collections, and not a word is said. But these sepoys of ants, the terror of all other insects, whose haunts and homes are strewed with the mangled remains of their victims, are selected and recommended to our special care and attention; why, it would be difficult to state, unless the sympathy for them be of that morbid kind which is exercised towards the greatest offenders. Certainly there is nothing in the manners of these ants to give them a preference in our affections over all other insects, and if it is wrong to hurt or disturb them, what may not other insects so remorselessly hunted complain of? But, gentlemen, be consoled: it is not necessary to do more than to take up and examine the loose bits of stick at the outside of the nest. I said before that my *first* handful was the best, and I have proved that the most of the beetles are to be obtained from the loose matter which the ants have carried up, and which it can do no harm to remove and replace. At this second search I took all the species I got on the first occasion, except the Othius, and in addition

Quedius brevis	3
Monotoma angusticollis	3
„ conicicollis	3

—*Id.*

Note on Holothuria.—In 1856 (Zool. 5181) I noticed that a Holothuria (*Pentacta pentactes*), in my possession, had voluntarily thrown off its tentacles, and did not appear to be incommoded by the loss. I have now the pleasure of adding that a new set of tentacles are forming, and that they have begun to bud out, pale and tender, to the extent of one-eighth of an inch. Reproductions of this kind are now so commonly known to occur that they are scarcely worth recording, unless, as in the present instance, one is able to give positive periods of time. I have notes of many other similar cases as occurring in my practice among other creatures. The water in the great glass jar, containing the Holothuria, has not been changed during the whole period.—*W. Alford Lloyd; 19 and 20, Portland Road, Regent's Park, London, W., April 5*, 1858.

Remarks on the Sale of the Entomological Society's Exotic Collection; a Letter addressed to the President.

Oatlands.

Dear Dr. Gray,

I address you, as President of the Entomological Society, myself ignorant whether or not you had any hand in the somewhat remarkable proceeding which has just taken place. I ask you to use your influence with the Society to mitigate, as far as yet may be,—in one instance at least,—a wrong which they have done to all those who have contributed to their collection. I ask you to make over to the children of the late Mr. Stevens, of Bogotà, whatever sum the collections which

he sent you may have sold for. Mr. Stevens, though a poor man, out of health and with children to provide for, made a great self-sacrifice to gratify his enthusiasm as an entomologist, that he might send you many rare insects, fondly hoping that he was conferring a present and future benefit upon the entomologists of his native country.

The sale of the collection in Paris was most disreputable, and I fear that you may apply the *tu quoque* to yourselves.

You have done that which may have a most injurious influence upon the welfare of other Societies. Who would be at the trouble and expense of sending some rare animal to the Gardens of the Zoological Society if there is a possibility that the object of his care may, by some freak of the Council, be sent to the hammer? You have done that which I believe to be neither lawful nor right. You are only life-tenants of the property which you have sold. Part of it had probably been so cherished through life by its possessor that he left it to your *care* to prevent its dispersion.

I am in total ignorance as to the promoters of this scheme, and therefore mean no personal affront to any one.

I am yours very truly,

W. C. Hewitson.

Reply to the preceding by Dr. Gray.

British Museum,

Dear Mr. Hewitson, April 20, 1858.

In reply to your note to me, without date, received this morning, I hasten to inform you that I have had nothing personally to do with the proceeding, and was not even on the Council when the subject was discussed. The resolution under which the sale took place was regularly conducted, and expressed, in a legal manner, the unanimous wish of the Society, and I believe that no wrong has been done to any one, the Society having selected and retained all the specimens which have been specially described from its collection. It is the general mistake of Societies of the kind to spread their exertions over too large a field, aiming at everything, and then finding that they cannot do any part well. Collections of insects, to be well kept, require one or more special curators, which the revenues of the Society will not afford to pay; the consequence is that the collections are not arranged so as to be useful for consultation, and get into a bad state; the library does not increase and is not catalogued, and the Secretary, however willing and industrious, is over-worked. The Society will therefore, I believe, derive great benefit from what it has done, as its officers will be able to give their exclusive attention to its meetings, publications and library, and make them more available to the members, and thus advantageous to the improvement of the Science.

I consider that the Society has every right to do as they have done, and every one of any experience in England or France must be fully aware that Societies of the kind cannot be considered as permanent institutions, and that their property must be liable to be distributed, like that of a private individual, though perhaps not as frequently. I do not suppose that you think that you or your executors are precluded from selling or otherwise parting with the specimens which have been presented to you by different collectors, and that their families should have any right to the proceeds of such sale.

If you feel so strongly on the subject it is much to be regretted that, as a member of the Society, you should not have objected before the sale was finished. The subject has been in discussion for several years; the resolution ordering the sale was passed at the anniversary meeting, January 28, 1856, more than two years ago; the sale was advertised in February last, and the catalogue distributed and sent to you at least fourteen days before the sale, and if you had then stated your objection, the evil (if it is any evil) might have been prevented, but as it is I fear that you must be considered equally in the wrong (if it is a wrong, which I deny) as the other members of the Society.

I am, dear Mr. Hewitson,

Yours truly,

JOHN EDWARD GRAY.

To W. C. Hewitson, Esq., M.E.S.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

April 5, 1858.—J. O. WESTWOOD, Esq., V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Proceedings of the Royal Society,' Vol. ix. No. 29; presented by the Society. 'The Zoologist' for March; by the Editor. 'Catalogue of British Coleoptera,' by G. R. Waterhouse, Esq, F.Z.S., &c., two copies, one of them printed on one side only; by the Author. 'The Literary Gazette' for March; by the Editor. 'The Journal of the Society of Arts' for March; by the Society. 'Exotic Butterflies,' Part 26; by W. W. Saunders, Esq., F.R.S., &c. 'Stettiner Entomologische Zeitung,' xix. jahrgang, Nos. 1—3; by the Entomological Society of Stettin. 'The Entomologist's Weekly Intelligencer,' Vol. iii.; the same, No. 79; by H. T. Stainton, Esq. 'The Athenæum' for February and March; by the Editor. A pair of Carabus intricatus, *Linn.*; by J. J. Reading, Esq.

Election of Members.

Alexander Wallace, Esq., of Bembridge, Isle of Wight, and H. G. Knaggs, Esq., of Maldon Place, Camden Town, were balloted for and elected Members of the Society.

Exhibitions.

Mr. Stevens exhibited a specimen of Papilio Ulysses, taken by Mr. Wallace in Aru, and observed that Mr. Wallace saw this species on the wing almost daily during his three months' stay in the island, but, owing to its high and rapid flight, he only succeeded in capturing two examples.

Mr. Janson exhibited various Coleoptera, handed to him for that purpose by Mr. Douglas, which had been recently taken by that gentleman in nests of Formica rufa; the species most noteworthy were Saprinus piceus, *Ill.*, Dendrophilus pygmæus, *L.*, Leptacinus formicetorum, *Maerk.*, and Thiasophila angulata, *Erichs.*

Mr. Janson also exhibited a specimen of Harpalus servus, *Duft.*, which had been detected by Mr. H. Squire among a number of unset Coleoptera presented to him by Mr. F. Smith, by whom they were captured, near Deal, last autumn. He observed that Mr. Squire, who had identified this insect, considered it specifically identical with Harpalus maritimus (*Kirby*), *Steph. olim* (subsequently sunk, in the 'Manual,' as synonymous with H. complanatus, *Sturm.*), as he found the individual exhibited agreed precisely with the specimens thus denominated in the Kirbyan, Stephensian and Leachian cabinets. Mr. Janson remarked that he had not himself yet had an opportunity of following Mr. Squire's investigations in this matter; he was therefore not competent either to confirm or contradict the view he advanced.

Mr. Janson likewise laid before the Meeting the following, which he had recently taken:—

Ocyusa ruficornis, Kraatz, Naturgesch. d. Ins. Deutschl. ii. 158, 2 (1856), a species not previously recorded as an inhabitant of Britain, and indeed only recently discovered by Dr. Kraatz, near Berlin. It has also been taken in the vicinity of Paris, and is described by MM. Fairmaire and Laboulbène in their 'Faune Entomologique de France,' i. 441, 33 (1856), under the name of Oxypoda fulvicornis: the specific title imposed by Dr. Kraatz will, however, stand by right of priority, his description being anterior in publication by several months. The present species may be at once distinguished from its near ally and as yet sole congener, O. maura, *Erichs.*, by its superior size, brown hue, longer antennæ, and by the bright brownish red colour of those organs and of the legs; other, less apparent, differences exist in the form of the thorax and in the sculpture and pubescence of the elytra, &c.

Hygronoma dimidiata, Grav., Erichs., Steph.

Stenus picipennis, Erichs., first discovered and identified by Mr. Edwin Shepherd, in the autumn of 1857, and subsequently taken, he had heard, by Dr. Power, in Hampshire.

Ischnodes sanguinicollis, Panzer (*Ctenicerus sanguinicollis*, Steph.). The female, which differs somewhat in size and form from the male, is unquestionably Sericosomus fulvicollis of Stephens.

In answer to a question of Mr. Westwood, relative to the localities in which these insects had been found, Mr. Janson stated that he had captured the last-named species in the London district; in respect to the other three, he was not certain whether the locality was situate within that limit or not,—at all events he might venture to say one of the home counties South of the Thames; this he considered quite sufficient for all scientific purposes, and most respectfully declined henceforth publicly to indicate the precise localities of his captures, an announcement which appeared to afford much amusement to some of the Members, as it was greeted with considerable hilarity.

Mr. Waterhouse exhibited the following species of Coleoptera, believing they had not hitherto been recorded as British, *viz.*:—

Hister marginatus, Erichs. Two specimens of this insect had come under Mr. Waterhouse's notice, one specimen in his own collection, and one in that of Dr. Power. The localities in which they were found are unfortunately unknown.

Saprinus immundus, Gyll. One specimen taken by Mr. Waterhouse, at the mouth of the Orwell, in September, 1855, and several specimens taken by Dr. Power and Mr. F. Smith, at Deal.

Saprinus metallicus, Fabr. Two specimens taken at Deal by Mr. F. Smith. This insect is given as British by Mr. Stephens, but he had mistaken the S. rugifrons, *Payk.*, for the species.

Abræus (*Acritus*) *nigricornis*, Ent. H. Found in the months of May and June in the corridor of the Crystal Palace.

Calodera riparia, Erichs. A single specimen taken by Dr. Power at Holme Bush.

Mr. Waterhouse also exhibited a specimen of a Plegaderus, which he supposed to be the P. dissectus, *Erichs.*, and stated that it was one of two specimens found in Windsor Forest by Mr. Samuel Stevens: a notice had already appeared relating to the discovery of the insect by Mr. Stevens, and Mr. J. F. Stephens, who published this notice in the 'Zoologist,' had regarded the insect as Abræus vulneratus, *Kug.*

Mr. Waterhouse then proceeded to describe four species of Staphylinidæ, which he believed to be new:—

OXYPODA NIGRINA.

O. *Nigra, opaca, sericeo-pubescens, pedibus fuscescentibus, corpore fusiformi, supra confertissime punctulato.* Long. 1 lin.

Very close to Oxypoda cuniculina, *Erichs.*, but rather smaller and usually of an uniform sooty black colour; the antennæ rather shorter, the terminal joint comparatively short and obtusely pointed; the elytra rather less strongly notched at the posterior outer angle; the tarsi (more especially the posterior pair) shorter. Head about one-third narrower than the thorax, rounded, convex; the parts of the mouth dusky; antennæ about as long as the head and thorax, gradually increasing in width to the apex, the last joint decidedly the shortest; first and second joints moderately elongate, obconic, and nearly equal; third joint about half the size of the preceding; of the remaining joints the first two or three are quadrate or nearly so, and the remainder (with the exception of the last) distinctly transverse. Thorax gradually contracted from the base to the fore part, the sides and the posterior margin gently rounded; above convex and even, or with a very indistinct dorsal furrow. Elytra about one-fourth longer than the thorax and rather broader, the puncturing fine, and, being extremely dense, produce a dull appearance. Abdomen attenuated and also very finely and densely punctured, the last segment and the edge of the preceding one often fuscous. Legs more or less dusky, with the knees and tarsi fusco-testaceous.

I met with this insect at Charlton in June, 1856, and at Erith in July, 1855, and some other localities not distant from London; it is also found in Scotland, Mr. Morris Young having taken it at Paisley.

OXYPODA NIGRO-FUSCA.

O. *Fusco-nigra, thorace, elytris, abdominisque apice fuscis; pebidus testaceis; corpore fusiformi, supra confertim subtilissime punctulato.* Long. 1 lin.

It was with some little hesitation that I ventured to separate this species from O. hæmorrhoa, *Mannerheim*, so much does it resemble that insect in size and form, as well as in the structure of the antennæ; the fuscous thorax and elytra I at first thought might only be indications of immaturity; I found, however, that all the specimens which presented this colouring had the thorax dull, whereas in O. hæmorrhoa the same part is somewhat glossy, and upon placing the two insects side by side under a

low power in the microscope, I soon perceived that the punctuation of the thorax was much more dense in the insect I call O. nigro-fusca.

Found in the *débris* left upon removing a stack of faggots in Bishop's Wood, near Hampstead.

Homalota plumbea.

H. *Plumbeo-nigra, opaca, griseo-pubescens, creberrime subtilissime punctata; antennis fuscis, pedibus fusco-testaceis; thorace subquadrato coleopteris multo angustiore; abdomine nitidiusculo.* Long. 1½ lin.

This species should be placed in Kraatz's second section, near to the Tachyusiform species, such as Homalota labilis, &c., in which the elytra are ample, distinctly broader than the thorax. It reminds one of H. incana, *Erichs.*, agreeing pretty nearly in size, form, and colouring with that insect, but it is much more thickly and finely punctured, and the antennæ are longer, and none of the joints are decidedly transverse; the legs, moreover, are paler. Head rather narrower than the thorax, convex and rounded, but with the eyes slightly prominent, and the parts of the mouth rather produced, the surface, like that of the thorax and elytra, of a somewhat dull and silky appearance, owing to the thickness and fineness of the puncturing, combined with a tolerable dense and fine ash-coloured pubescence; palpi and antennæ dusky, the latter sometimes, with the base, dirty testaceous; they increase very slightly in thickness towards the apex; the first three joints considerably elongated and very nearly equal; of the following joints the first are rather longer than broad, and the penultimate quadrate; the terminal joint nearly equal in length to the two preceding taken together. Thorax subquadrate, slightly emarginate in front; the sides presenting a very gentle sigmoid curve, being a little dilated and rounded towards the fore part and slightly contracted behind; posterior margin rounded, posterior angles obtusely rounded; anterior angles rather acute; upper surface moderately convex, and with a somewhat large and shallow depression behind. Elytra ample, fully one-fourth longer than the thorax, and nearly twice as broad. Abdomen growing rather broader towards the hinder part, very thickly and finely punctured throughout. Legs testaceous; the femora and tibiæ more or less suffused with brown. I can perceive no differences indicative of sexes in the specimens before me.

Found by Dr. Power, at Seaford, near Newhaven.

Homalota imbecilla.

H. *Linearis, subdepressa, subtiliter pubescens, nigra, nitidiuscula, antennis pedibusque fuscescentibus, ano elytrisque testaceis, his basi fuscis; thorace transversim subquadrato; abdomine supra omnium crebre punctato.* Long. 1⅓ lin.

Head very little narrower than the thorax, rounded and moderately convex, very finely and rather thickly punctured; antennæ, if bent back, reaching about to the apex of the elytra; slender and with no perceptible increase in thickness towards the apex; the penultimate joints as long as broad; the middle joints longer than broad; the terminal joint nearly as long as the two preceding joints taken together; palpi fuscous, paler at the base. Thorax subquadrate, slightly broader than long, straight in front, very gently rounded at the sides, and more distinctly rounded behind; above gently convex, very finely and thickly punctured, and with a shallow fovea behind. Elytra scarcely longer and very little broader than the thorax, and very thickly and rather

finely punctured. Abdomen with all the segments thickly and finely punctured; the punctures, however, on the terminal segments are a little less dense than on the basal; from the apex of the abdomen spring numerous longish hairs. First joint of the posterior tarsi a trifle longer than the second.

I found several specimens of this insect under *rejectamenta* at the mouth of the Orwell, in September, 1855. It is a soft and delicate little insect, and subject to considerable variation in colouring, chiefly in the elytra, these being sometimes entirely pale and sometimes entirely pitchy, but usually they are dusky at the base, and this dark colour is more or less extended in different individuals; the apex of the abdomen is always pale.

H. imbecilla, together with H. fluviatilis, *Kraatz*, H. cambrica, *Wollaston*, and H. thinobioides, *Kraatz*, may be grouped together as linear species allied to H. elongatula, but distinguished by the abdomen being thickly punctured throughout.

H. fluviatilis—or rather an insect (found on the banks of the Thames, near Hammersmith, by Mr. Squire) which I suppose to be the species so named by Kraatz—approaches the nearest to H. elongatula, but differs in being rather smaller, in having the body black throughout, the antennæ dusky (or impure black) to the base, the head rather narrower and less rounded, the sides being nearly parallel, and the thorax rather longer.

H. imbecilla is about equal in size to the smallest specimens of H. elongatula; the antennæ are longer and more slender than in that insect, sometimes fusco-testaceous throughout, and sometimes entirely dusky; the legs of a less bright and clear colour, being more or less suffused with brown or dusky at the base.

H. cambrica is very like H. imbecilla, but its form is more slender, its elytra are longer, and the punctuation is finer and more dense; that on the thorax and elytra, indeed, is so delicate as to be scarcely perceptible under a strong Stanhope lens, whilst in H. imbecilla the puncturing throughout is tolerably distinct.

H. thinobioides is the smallest of the group and the most slender in its make, but very like H. cambrica: its colouring is darker, and the punctuation of the abdomen is still more dense.

This note is made upon specimens from Madeira, given me by Mr. Wollaston.

Mr. Westwood remarked the admirable manner in which the Abræus exhibited by Mr. Waterhouse was set, every tarsus being spread out. Mr. Waterhouse thereupon informed the Meeting that the plan he adopted to set out small Coleoptera, of this and some other families, was to gum the insects slightly down on their backs (using gum Arabic for this purpose): the legs, &c., were then readily spread out with a camel's-hair pencil, after which the insect was easily removed by gently inserting the point of a pen-knife under it, and then placed in its proper position on gummed card: by this simple process many species could be set out, of which it is otherwise almost impracticable to display the limbs.

Mr. Waterhouse also detailed another plan, which he had found very useful, in setting out those tribes of small Coleoptera in which the limbs are rigid, such as the Curculionidæ, &c., *viz.* to gum the insects on card, without attempting to set out the legs, &c., until the gum has dried, when by slightly moistening the limbs, on one side of the insect only, they were very readily brought to their required position with the setting needle, and, on their again becoming dry, the other side could be treated in a

similar manner; by gumming out several insects at once no time need be lost, as whilst one specimen was under process, the others would be drying.

Mr. Tegetmeier exhibited a newly constructed bee-hive, which consisted of two or more boxes, designed to be placed one above the other, each one furnished with moveable bars, to which the combs are attached, thus affording great facility for the removal of the latter, either for the purpose of scientific research, the partial deprivation of honey, or the artificial production of swarms. The bars are retained in their places by long wooden slides passing between them, which obviate the necessity for covers, enable a single bar of comb to be removed without disturbing those remaining, and permit the removal of the top boxes to be most readily accomplished. The boxes are square in form, and so constructed that bars of brood or honey-comb can be easily transferred from one to another.

Some discussion having arisen relating to the construction of the cells of the hive bee, Mr. Waterhouse stated that he was of opinion that the hexagonal form of cell was accidental, so far as the constructors of the cell were concerned; and, having been called upon to explain his views, he proceeded, in the first place, to call attention to the fact that if a number of cylinders of equal size were packed close together, side by side, each cylinder would be surrounded by six others; that, assuming the cylindrical form (or at least a form of cell approaching more or less to the cylindrical, and having a circular section) was the type form of isolated cells constructed by different kinds of bees, and that, in the case of the hive bee, a number of insects worked together, first depositing a small portion of wax, then excavating a small circular cavity in the same, for the commencement of a cell; this then being followed by the deposition of more wax and the excavation of more cavities, and these being placed close to the first; then neither of the cells could be constructed of their natural diameter, provided the first cavity formed had not attained the full diameter of the complete cell. The diameters of the cells would intersect each other; but, if partitions be left between them, the cell must be six-sided, if the cells remain equal in size. In order to make the idea more clear, he (Mr. Waterhouse) would assume for a moment that it were a law that a number of equal-sized circles, being packed closely together, side by side, and that each circle was then surrounded by seven others; he believed that the cell of the hive bee would, in that case, have been seven-sided. Such were the views entertained many years back by Mr. W., and published by him in the 'Penny Cyclopædia;' and having subsequently had his attention particularly directed to the subject, whilst examining the nests of a vast number of Hymenopterous insects, he still believes those views to be essentially correct. He now, however, has reason to believe that it is not absolutely necessary for the supposed natural diameters of the cells to intersect before an angular-formed cell would be produced. The instinct which leads an insect to excavate, in order to form a cell, may lead it to excavate beyond what would be necessary to form a sufficiently large cell, in the case of an insect, which, under ordinary circumstances, burrows until it comes in contact with an adjoining cell. Contact with other cells was the essential condition which influenced the angular form of any particular cell. It has been brought as an objection to his theory, Mr. W. went on to say, that, in the case of the wasp or hornet, a single female insect constructs hexagonal cells. This is true, but the same principle obtains,—no wasp builds a single, isolated, hexagonal cell; when wasps, or allied Hymenoptera, build hexagonal cells, many cells are built almost simultaneously, the first cell has made the least possible progress

before six other cells are commenced around it, and these again have progressed very little before others are commenced external to them and in their interstices, so that a wasp's cell may be said to be altered into the hexagonal form as it proceeds, excepting in the case of the outermost series of cells, where only the inner side of each cell is angular, the outer side being almost always rounded. Mr. Waterhouse said he had possessed a very small nest of a hornet which consisted of three cells only; it was built in a small cavity adjoining a large nest, and where there was not room for more than three cells; they were circular externally and angular internally,—that is to say, each cell had two straight sides where it came in contact with two other cells, and was rounded elsewhere.

Mr. Tegetmeier remarked that he possessed a small piece of honey-comb which presented the same peculiarities.

Mr. Tegetmeier added that he had found it a great improvement to have double glass to observatory hives.

In answer to a question from Mr. Lubbock, Mr. Tegetmeier stated that he had not made any observations, confirmatory or otherwise, of the theories advanced by Professor Siebold, relative to the reproduction of these insects.

Mr. Murray observed, with reference to this subject, that Professor Simpson had transferred eggs from drone to queen cells, and that a larva produced therefrom grew so large that at length it reached the glass of the observatory hive in which the experiment took place, and then died: he thought it would be interesting to have this grub dissected, in order to ascertain whether it was a female or not.

Part 7 of Vol. iv., new series, of the Society's 'Transactions' was on the table.—*E. S.*

Northern Entomological Society.

March 27, 1858.—B. Cooke, Esq., President, in the Chair.

Election of Members.

T. P. Marrat, of Liverpool, and James Thompson, of Crewe, were elected Members.

Exhibitions.

Capt. Cox, of Fordwich House, sent for exhibition three volumes, containing drawings from life of Lepidopterous larvæ upon their food-plants, by Mrs. Cox: the accuracy and beauty of the drawings were much admired.

Mr. Greening exhibited a box of Stegoptera, *Newman*, captured near Warrington, and at Llanferras, North Wales, in 1858: amongst them were specimens of Hydropsyche tenuicornis and H. angustata, Polycentropus subpunctatus, Leptocerus interruptus, male and female, L. quadrifasciatus, Melanna nigripalpis, Phryganea varia and P. grandis, Helisus hieroglyphicus, Limnephilus binotatus, L. notatus, L. præusta, &c., and called attention to this beautiful and interesting order, observing that "the more we saw of Newman's 'roof wings' the nearer we should place them to his 'scale wings,' as described in the 'Insect Hunters.'"

A Member observed, he had seen some foreign Stegoptera, which few men could separate from Lepidoptera, and which he should have pronounced 'scale wings' if they had been set.

Mr. Greening also exhibited a fine Cicada hæmatodes, taken in the New Forest by Mr. Bond, and specimens of Trogosita mauritanica, taken at Warrington.

Mr. Kendrick exhibited a box of Coleoptera and Ichneumonidæ, captured around Warrington, containing some rare species, and all particularly interesting as illustrative of the Fauna of the district.

A discussion ensued on the advisability of Members exhibiting local captures irrespective of rarity, and it was generally admitted that though very rare species might interest naturalists at the top of the tree more than the ordinary run of captures, yet, as a rule, more information was disseminated by one good box of local captures, however common some of them might be, than by a single species, however rare.

A Member observed that this seemed to him the great oversight at all the Natural-History Society Meetings which he had attended,—the object of the exhibitors seemed to be to bring something the President and Vice-President alone could appreciate, forgetting that there were always young naturalists and members from a distance present to whom their common local species would prove a feast for the eyesight.

The President exhibited specimens of Acheta sylvestris, captured in the New Forest: also specimens of Ctenophora bimaculata, Sarcophaga lineata, &c., bred this spring.

The Rev. H. H. Higgins exhibited a large box of local Diptera, captured within twelve miles of Liverpool Exchange: this interesting exhibition admirably illustrated the remarks which had been made by other Members upon this subject.

Mr. Higgins then called attention to some dead hive bees, which had been sent to him to ascertain the cause of death: he had found the spores of Fungi within them, but it was observed that the Fungi formed after death, and little doubt was expressed that the loss of the hives arose not so much from Fungi as from placing the hives in a bad winter situation, either where the hives had the sun upon them at some part of the day, or where the air was damp and ventilation bad.

A Member, once an unfortunate bee-keeper and afterwards a successful one, observed that he used to lose many light hives, which, as in this case, might be attributed to Fungi: hives of from 37 to 40 lbs. could only just support themselves through the winter, if left in the summer quarters; whereas, he found, if placed behind a wall with a northern aspect, where the wind was free to blow upon them, and where the sun never could shine upon them for a moment, Fungi never appeared even in the few bees which inevitably die during winter, and the hives lost a very small per centage of weight, and came out strong in bees as in honey when placed in summer quarters again: this fact was now generally known to apiarians, but unfortunately farmers were slow to believe it.

The Secretary, on behalf of Mr. Parfitt, of Exeter, exhibited Latridius filiformis (n. s.), Anommatus duodecemstriatus and Leptogramma Parisiana (bred); also a box of Coleoptera, from the Rev. A. Matthews, containing Trichopteryx sericans, *Heer*, T. pygmea, *Erich.*, and T. curta, *Gyll.*, Ptilium angustatum, *Erich*, P. Kunzei, *Heer*, and P. excavatum, Ptinidium apicale, *Erich.*, and P. pusillum, and read a letter from Mr. Matthews, informing the Meeting that he had recently found two genera new to the British list, and which he had described in the April number of the 'Zoologist' (Zool. 6032).

The Secretary then exhibited two beautiful varieties of Hadena Atriplicis, recently presented to him by Mr. Doubleday, and a Continental specimen of Abraxas pantaria, and read Mr. Doubleday's remarks upon this species.

Mr. Gregson exhibited a box of Coleoptera, captured during the winter, principally in the "North and South Reserves" at Birkenhead, observing that those who desire to work up the Geodephaga and Brachelytra should lose no time, as the "Reserves" (formerly the bed of Wallasey Pool) are no longer reserved, but intended to be converted into docks forthwith. He also exhibited Rhyzophagus bipustulatus alive, taken at Garston, whilst waiting for a train: this little beetle had entirely destroyed some of the fir trees in the plantations around.

The Secretary then read the following, at the request of Mr. Douglas:—

Metamorphotic Systems of Classifying Insects.

"I am not going to write an essay on this subject, but as the President, at the Meeting on the 26th of December last, as reported in the 'Zoologist' for February (Zool. 5951), has proposed a system of classification founded on metamorphosis, I just venture to say a word thereon. The principle of adopting the differences of metamorphosis in insects as a basis for dividing them into orders is not new, having been employed by Swammerdam, Lamarck, Oken and others, and the particular method now brought forward differs in no material respect from that proposed by Newman, in a paper read before the Linnean Society in 1834, published in the third volume of the 'Entomological Magazine,' subsequently modified by the author in his 'History of Insects,' p. 76, in the 'Zoologist' for 1853 (Zool. App. p. clxxxv.), and in the 'Insect Hunters,' pp. 10—13. The only difference that I can see is that Mr. Cooke mixes the Amorpha and Necromorpha, and gives the name Trichoptera to that portion of the old Neuroptera which Newman has separated under the name of Stegoptera. I do not propose to discuss the truth of the system propounded, but supposing the theory adopted by Mr. Cooke to be right in principle, then it is a manifest retrogression from that proposed on the same principle by Newman, and I think it is only right that author should have the credit of whatever merit may be due to the original propounder of the system."

The President disclaimed all desire to take to himself any credit due to others; he had perhaps attributed to Mr. Dallas that which was due to Mr. Newman, but he was the last man to sully the motto of the Northern Entomological Society, "Honour to whom honour is due." He then read the following paper in reply to Mr. Douglas:—

"I beg to be allowed a word in reply to the remarks which have just been read.

"Of Mr. Newman's treatise, published in the 'Entomological Magazine,' I have seen no more than the short abstract given in Westwood's 'Modern Classification.' The article "Proposed Division of Neuroptera into two Classes" (Appendix to the 'Zoologist' for 1853), I read at the time it was published; but, not paying much attention to the subject then, I did not look at it again until my attention was called to it last month: I must own that I had completely forgotten it.

"The 'Insect Hunters' I did not see until after my paper was read at our last Meeting, and knew no more about it than what I was informed by the wrapper of the 'Zoologist' for December.

"Mr. Newman applies the name Stegoptera to the order containing the Trichoptera: I think it is a decided improvement, and shall adopt it. I ought also to have used the termination *ina* where a tribe or group of families was intended, as Staphylinina, Phryganeina.

"For the application of the name Trichoptera Mr. Douglas is ready enough to find fault with me, but he is apparently blind to a defect of the very same kind in his friend: in the order Hemiptera Mr. Newman includes the Cicadina, Coccina and Aphidina, which are no more hemipterous than the Panorpina are trichopterous.

"Mr. Douglas says that I mix the Amorpha and Necromorpha. I suppose he means this: that in my plan of arrangement the first and second orders have the pupa necromorphous, the third and fourth amorphous, and the fifth, the Stegoptera, necromorphous. If Mr. Douglas will examine Newman's arrangement of the Diptera, identical with Walker's, I think he will there see that the word 'mix' may be used with more propriety. In that arrangement the single tribe Stratiomina, of comparatively small extent, having the pupa obtected, is placed between tribes of considerable extent, having the pupa extricated.

"But, with regard to the order Stegoptera: I place it close to the Lepidoptera; Mr. Newman places it close to the Coleoptera (with which I see very little affinity), and removes it as far from the Lepidoptera as his system will admit of. Now, let us see what he says in reference to a great portion of this order. In the Preface to the 'Zoologist' for 1857 Mr. Newman asks this question, 'Why is not the entire tribe of Phryganeina lepidopterous? The cased larva is no objection; *the form of pupa is no objection.*" I need not quote any more; surely there can be no objection to placing the Stegoptera close to the Lepidoptera. Yet it is on this ground, if I have understood him rightly,—and I do not see how I could have misunderstood him,—that Mr. Douglas makes the positive and authoritative assertion that my plan of arrangement is a 'manifest retrogression.'

"But Mr. Douglas is anxious that Mr. Newman should have the credit of whatever merit may be due to the original propounder of the system: I am glad to have the opportunity of saying that in this I most cheerfully and heartily concur."

An animated discussion followed the reading of the President's paper.

Attention was called to Mr. Reading's notes on the modes of capturing Carabus intricatus, &c., in the 'Zoologist,' so different to the usual announcements of captures, which were generally mere trumpets sounded by the writers, and gave no practical information to other naturalists.

The attention of the Meeting was also called to the 'Insect Hunters,' by Newman, a Member observing that it was the first book from any author who seemed to understand the art of teaching Natural History pleasantly, particular stress being laid upon the advisability of all young naturalists acting up to the text of the valedictory chapter.

A vote of thanks being passed to all who had contributed to the pleasure of the evening, especially to the lady of Captain Cox, the Meeting separated.—*C. S. G.*

On Reason and Instinct. By the Rev. J. C. Atkinson, M.A.

(Continued from page 6054).

With regard to the presence and operation of Instinct in man the positions which, it appears to me, are most consistent with observation and sound reasoning, may be designated thus :—

I. That man in an uncivilized state* is the most influenced by the impulses of Instinct; so that in some of his actions, whether more or fewer, that essence or attribute may even predominate over Reason, as a practical rule of action; in an almost isolated action or two, may even operate to the exclusion of Reason.

II. That, presumably, as he emerges from the uncivilized state, Instinct, by degrees, ceases to have any predominant power, and, infancy past, in no case utterly excludes the operation of Reason.

III. That in a fully civilized state Instinct survives indeed, but is so restrained and regulated in its operation by Reason, that it becomes difficult to allege any but a very few of man's daily actions as influenced by it; or even to distinguish between the workings of Instinct and the rulings of Reason in actions, which, according to analogy, are originally due to or prompted by Instinct.

IV. That beyond all this, if by any chance man treads in a backward order the steps he has already imprinted in his passage from the uncivilized to the civilized state, he, at the same time, and as if

* I purposely avoid using the words "in the state of nature," as indefinite and indefinable. I do not take the condition of any savage tribe or community to be the state of nature, because it is impossible to say what processes of change, moral, physical, psychical, of improvement or deterioration, such tribes may have passed through and may be still in course of passing through. Probably, the only human creatures in speaking of whom the expression "in the state of nature" could be correctly employed, would be our first parents in their earliest experience of life: and just as probably there are the materials for a fierce discussion in any attempt at realising what that condition was. One theory I have met with is, that they were idealess savages, and such as idealess savages anterior to experience must necessarily be: a theory I should be sorry to assent to, even for argument's sake. Another, that they were the noblest specimens of humanity ever seen in the world; noblest, physically and intellectually; and that the general tendency of the species since has rather been to deterioration than in the opposite direction. The truth, as ever, probably lies between these two extremes of opinion, and it would be an interesting theme for discussion in the hands of one of sufficient attainment, moderation, and power of vision at once comprehensive and discriminating.

inevitably, becomes clothed upon again with some of his instinctive habits, and loses some of the finer functions of Reason : and that it is difficult to say how far this may hold good ; difficult, I mean, from the exceeding difficulty, or rather, the impossibility of tracing historically the records of continuous declension, in the case of any degraded community, from what was, at least presumably, its once higher condition as to civilization, its once higher moral and intellectual standing.

I hardly know whether the limits of a paper in the 'Zoologist' will permit me to do much more than simply trace the outline of observation and argument by which these positions are supported. To convert the sketch into a finished drawing might occupy both too much time and too much space. Perhaps our simplest course may be to attempt at the outset to enumerate or classify the several lines of force or directions of impulse in which Instinct appears to operate in the inferior animals, and then to inquire what degree of analogy is traceable between such and such actions or lines of action common in the several cases of them and of mankind.

I should say that, allowing for a few anomalous instances which, in our present state and degree of information, seem to admit neither of explanation or of classification, all, or very near all, the instinctive actions of the various animals may be brought under one or the other of the following heads :—

I. Fear or self-preservation : by which, in various ways, almost equally numerous with the varieties of animals themselves, they are impelled to the effort to avoid danger.

II. Food-craving : by which they are enabled to discover supplies of suitable aliment ; to discriminate between the suitable and the unsuitable ; to adopt the necessary means of securing it by the appropriate use of their various faculties and endowments of sense and body ; and so on.

III. Sexual love : by which they are impelled to coition, or cohabitation for one season or more ; to nidification, whether more or less elaborate ; to the concealment of their young ; to the various modes of providing for their young ; and the like, according to their several tribes or habits or peculiarities.

IV. Association : by which the various gregarious creatures, whether habitually or periodically, according to sex or according to season, under the ties of family or under those of species or pursuit of some common object—food for instance—live in communities.

V. Migration: under which vast numbers of creatures of very various tribes and families and species take journeys, possibly of enormous extent as contrasted with the powers of the travellers, from one district or country to another, at whatever season and with whatever object apparently kept in view by nature; such as a more abundant supply of food, a more genial temperature, or the continuation of the species.

VI. Local direction: or the law in virtue of which they retrace their course to given places from considerable distances; as for instance, the bee to its hive, alike in the forests of America and Africa and the cottage gardens of England, the salmon to its birth-stream, the swallow to the chimney or shed it was hatched in, the dog, the cat, the ass, the deer, the pigeon, and other animals without end, to their customary haunts after having been driven or forcibly conveyed to great distances therefrom, and under every disadvantage in connexion with finding their way back.

VII. Providence: under which certain species lay up in store, while the supply is yet abundant, various materials of sustenance for themselves or their young, against a season when the supply shall have failed or become inaccessible.

VIII. Hybernation: under which again certain species prepare a suitable abode for the coming winter, and, in due time, on its approach, betake themselves thither and become torpid or dormant for the season prescribed by nature.*

Now, in savage tribes, and in more or less uncivilized or very imperfectly civilized communities, I think one is frequently led to notice evidences of the instinctive impulses of Food-craving, of Fear, of Association, of Local direction, and, from time to time, of Migration.

* I am aware that in the list given above it will be difficult to find a place for the admission of such workings of Instinct as are evidenced in the newly-hatched young duck or other aquatic bird, when it hastens into the water; in the down-covered chicken or partridge, when it takes its food by pecking from the ground; in the equally infantile corn crake pecking from the stalks of the herbage it lives among and not from the ground; and other instances of the same class. And it is almost equally difficult not to construct, but to name a class for their reception. I must, therefore, content myself with this notice of all such instincts in young animals. Further, I wish to remark that, as will appear by a reference to the instinctive processes or powers enumerated, I have not included mere appetites or desires. Indeed, as Dr. Carpenter shows (Human Phys. p. 784) a Desire, properly speaking, depends upon a purely intellectual operation for its formation, and especially before it can be fully entertained. And the same is true of Appetite if it be taken in its true sense, and not, in a lax sort of way, as a mere synonyme to Instinct.

It appears originally to be as much by Instinct that man is induced to the pursuit of game,—including under that term every creature, from the majestic elephant down to the merest insect, the capture of which is profitable to man, and especially for the purposes of food,—as it is that the lion and the tiger, the crocodile and the shark, the eagle and the hawk, that all animals of prey, without exception, are impelled to the attack and capture of their several quarries. The savage seems to pursue the wild creatures that are the main elements of his subsistence as naturally, or — what is here synonymous—as instinctively as they seek to elude or escape his pursuit. And, moreover, it is one of the last instinctive impulses or longings which seems to die out under the effects of long-continued civilization and its concomitants. English Mr. Briggs is just as keen, after thirty or forty years of yard-measures and counter-skipping, for his salmon-fishing, and deer-stalking, and grouse-shooting, as French M. Bourgeois, when expatiating at a distance from his accustomed *boulevards*, for his *gibier* of sparrows, tomtits, and "such small deer."

Moreover, the intuitive perception, the marvellous keenness and precision, the unfaltering sleight and skill available to the savage or nearly savage man for the capture of food-animals or the discovery of food-vegetables are worthy of attentive consideration. The Australian native, the Bushman, the native of Interior Africa will fare sumptuously for days or weeks where the European would perish helplessly of starvation; roots, insects, grubs, — affording no appreciable token of their whereabouts except to the native eye,—serving to supply them with materials for even luxurious enjoyment rather than simply for bare sustenance. The pit-falls too, and hidden traps adopted by the savage for the capture of his game, are but parallels to the pit of the ant-lion and the web of the spider; while the unfaltering wariness and silent footfall which characterise his every movement, even when not engaged in the chase, are but a repetition of the stealthy pace and noiseless motion of the beast of prey when intent upon surprising its intended victim.

Again, what we understand by a coward is a much greater rarity among a savage or uncivilized race than in the dwellings of cultivated life: and yet the shifts and expedients and devices adopted by savages, alike individually and collectively, for the purpose of eluding or avoiding danger, on this side from human foes, on the other from wild beasts, are as various as they are remarkable. Some build their habitation—each habitation almost a village—on a foundation of tall

posts; others fly from the neighbourhood of everything which might render a locality eligible as a residence, and in consequence liable to be visited by a party of possible enemies or marauders; others again hide singly, so closely that nothing but cunning equal to their own can detect their hiding-place, and even it is often baffled; and others yet adopt the most wonderful devices to mislead or evade pursuit. Their keen apprehension and almost intuitive perception of lurking danger too, is absolutely astonishing. A leaf or twig bruised or set awry, the displacement of a pebble or a few grains of sand, the almost indiscernible flattening or crushing of a blade of grass or dry lichen on a hard rock, a thin column of ascending smoke, the merest tatter of a torn article of raiment, are in an instant observed, scrutinized and made to give up copious information, where to the unremarking, unacuminated eye of the civilized man there would be no more suggestive material than in the filthy wares of the rag-merchant or the torn fragment of a copy-book from some village boy's kite's-tail.

Now, in all this it is impossible not to be struck with the analogy—much less modified than might have been expected, by the vastly higher intellectual organization possessed by the savage man as compared with even the highest brute—between the avoidance of danger by the uncivilized man and by the other animals of creation. An analogy, indeed, so striking, that we are not so much justified in calling it instinctive as compelled so to call it. For the purpose of showing this analogy more conspicuously, I will not repeat again instances of brute caution and stratagem already often repeated, but will select one or two observations recorded by Dr. Livingstone, which forcibly arrested my attention in the perusal of his absorbing narrative. "It is curious," he says, "to observe the intelligence of the game: in districts where they are much annoyed by firearms, they keep out on the most open spots of country they can find in order to have a widely extended range of vision, and a man armed is carefully shunned. From the frequency with which I have been allowed to approach nearer without than with a gun, I believe they know the difference between safety and danger in the two cases. But here, where they are killed by the arrows of the Balonda, they select for safety the densest forest, where the arrow cannot be easily shot: * * * * and on several occasions I have observed there was no sunshine to cause them to seek for shade."—('Livingstone's Missionary Travels,' p. 280). Again, "Ants surely are wiser than some men, for they learn by experience. They have established

themselves on the plain where water stands so long annually as to allow the lotus and other aqueous plants to come to maturity. When all the ant-horizon is submerged a foot deep they manage to exist by ascending to little houses built of black tenacious loam on stalks of grass and placed higher than the line of inundation. This must have been the result of experience, for, if they had waited till the water actually invaded their terrestrial habitations, they would not have been able to procure materials for their aërial quarters unless they dived down to the bottom for every mouthful of clay."—(Id. p. 328). Once more, "When the wounded buffalo heard the approach of his pursuers he always fled, shifting his stand and doubling on his course in the most cunning manner. In other cases I have known them turn back to a point a few yards from their own trail and then lie down in a hollow for the hunter to come up."—(Id. p. 266). Space will not allow me to do more than allude to the habits and stratagems of the fox, the deer, the hare—not to mention other animals — when subjected to pursuit,* many of which are familiar as household words from their surprising nature and continued publication; to the devices of the hare when about to resume her form; of the rabbit for concealing her young, (actions, all of them emanating originally and principally, if not exclusively, from Instinct), in the attempt to illustrate the marvellous analogy observable between the habits and actions of the savage man, under the apprehension of danger, and those of the wild animal when under the powerful impulses of instinctive Fear or self-preservation.

As to Local direction, a remarkable instance of continual occurrence is cited above. The white man, in the American forest without his compass, loses his way before he has gone out of ear-shot of his tent, and possibly spends hours in delineating with his weary feet ring over ring within the space of a mile or half a mile square.† The red man

* See Mr. Couch's notice on the connexion of Reason and Instinct (Zool. 5667) for a very remarkable case in point as regards the hare.

† "Long practice is requisite to enable the white man to walk straight, even for half a mile through the bush. At first, he invariably deviates, thinking he is taking a straight course, and describes a circle, ending at the very spot whence he started. When there has been no sun, I have gone completely round in a square half mile."—(Hardy, i. p. 33). The native of a moorland district, when trying to traverse the moor in a fog, if he lose the familiar track, is in the same predicament. An aged parishioner of mine once told me his experience in a case of this sort. There was no great extent of moor where he went astray, but for six hours he was tramping wearily on in a never-ending, irregular sort of spiral. The crowing of a cock at last revealed to him the neighbourhood of a dwelling, — if I remember right, the very one he had

guides his steps as unerringly as though his eye were fixed on his bourne, or an automaton compass, self-explaining, moved on before him; I give a similar illustration from Dr. Livingstone: "The grass at this place was so tall that the oxen became uneasy, and one night the sight of a hyæna made them rush away into the forest to the east of us. * * *. Our Bakwain lad had gone after them, but had lost them in the rush through the flat, trackless forest. He remained on their trail all the next day and all the next night. On Sunday morning, as I was setting off in search of him, I found him near the waggon. He had found the oxen late in the afternoon of Saturday, and had been obliged to stand by them all night. It was wonderful how he managed without a compass and in such a country to find his way home at all, bringing about forty oxen with him." — (Id. p. 168). Now, this instinctive capacity of self-guidance is a characteristic of no insignificant portion of the existing human inhabitants of the globe. Many and numerous tribes in America, Africa and Australia, are known to possess it in a greater or less degree, and thus present a very remarkable instance of the existence and energetic operation in the human species of pure, unquestionable Instinct.

Again, as to Association. The lodges of the American Indians, the kraals of the Hottentots and Caffres, the villages or towns of Dr. Livingstone's route from the East Coast of Africa to the West, the tribes of Australia possessing no fixed or permanent habitation, but always living together—all tell the same tale—all deliver the same doctrine. You never hear of individuals of savage or uncivilized people living singly, in isolated seclusion from their fellows. Even the outcasts from other tribes, fallen and degraded as they are as to all that elevates humanity, as to all indeed that worthily characterises humanity, though they scarcely know the use of fire, or recognise the ties and sanctions of domestic life, yet herd together in their dens and caves, live a life in common wherever and whatever the site of their squalid common home may be.

And lastly, to pass to the subject of Migration. This has been a

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left shortly before he lost himself,—and so put him again into the track he knew. I have known the sportsman with his attendant, who almost knew every hollow and track on the moor, obliged to sit down and wait the lifting of the fog which had come on them unawares. And I have myself, on a narrow strip of moor which I had traversed scores of times in all directions, and with a companion who knew it as well as I did, missed my direction in crossing it, at the first attempt getting 45° too much to the south, and the second as much to the north of my true course.

law of man's nature from the earliest period of his history; a law subject to modification under the various circumstances and exigencies of the race variously modified at various epochs and localities; but yet in its great root and principle essentially the same as impels the swallow, the crane, the woodcock, the lemming, the rat, the salmon, to their annual, or periodical, or occasional journeys of removal from old, but no longer fitting scenes and episodes of life, to others newer and replete with the requisites which had sustained, or were about to sustain, failure in the old. As the family of man in the elder ages of human life received ever-continued accessions, and the non-existence of sources of proportionate decrease made each accession an almost positive gain in population, tribes that were offshoots of the parent tribe must have been thrown off in all directions; and from these again, as new centres of the globe-peopling process, others newer went forth into the heretofore untrod, untried wastes of Creation. True, at the Flood, such comparatively limited portions of the earth's surface as had owned the hand of its human lord were again depopulated; but only for the repeopling process to go on with a rapidity before unrealised even in idea. And before long, numerous families, each family already a tribe in miniature, pushed their way and their fortunes into every portion of the world, exploring in every quarter scenes and countries hitherto unvisited and unseen by mortal foot or eye. Then the Tower of Babel heard the already recognised law of migration authoritatively promulgated—beheld it branded into the living tablets of human nature. And the law has never yet become effete. No portion of it has been annulled. Its operation—certainly never for long even suspended—has never ceased to afford evident tokens of its continuance. Look at the "Great Migration," as it is called, which Europe saw before the mediæval times, the colonizations of still and much earlier periods, the irruptions of huge hordes of fierce herdsmen-warriors in many an age and many a country in Asia and Africa, upon lands and labours they knew not of, except it were by a dim, dreamy hearsay, myth-like both in its vague dimness and its fundamental element and substratum of truth. These illustrations of the Instinct which impels—I use the word advisedly, which impels—the human species to migration from the scene of failing capabilities and resources to newer ones of abundant supplies and exceeding susceptibility of development, are as numerous as the ages which have looked upon man's existence, as striking as the succession of scenes that have been ever newly presented to his wondering gaze as he has been again and yet again

driven to seek some newer and fitter abiding place. The illustrations of our first position, up to this point adduced, cannot be without weight to one who thoughtfully and dispassionately considers them. There are, however, others of a somewhat similar, or at least analogous description, which seem to me both interesting and instructive: I mean such as may be derived from observation of the habits or powers of the young savage.

Both the eye and the ear among savage or uncivilized tribes are apt to be, so to speak, if not in intention, yet in effect, much more carefully trained and strengthened than the other organs of sense; and to such a pitch of delicacy and keenness do the senses of sight and hearing attain, that a white man is often astonished at the power evinced by both. It is not that there is any anatomical difference in the eye or ear of the Savage and the citizen of London or Paris, or that the natural organ of him who never heard of a telescope is more highly organised than that of the man who rejoices in his Dollond, but simply the result of practice or use; but it is the practice or use, not of individuals, but of generations and for ages; for it must be observed that the young savage is to a great degree born with this keen vision and sense of hearing. And not only so, without any special course of teaching and training, any cumbersome ceremonial of "precept and example too," he begins—long before either years or stature place him in advance of the period or pursuits of childhood—to exercise the powers by which his father is so mysteriously enabled to track the, to other eyes save his own, invisible footsteps of the man or the wild beast, to tell how long since it passed, its stature, its peculiarities of gesture and gait, may be its very sex and age. Nor is he at a loss in the forest: like his father, his compass is nature-given, and he threads his unfaltering way through forest thickets and tree-canopied shades, that one would think might baffle any save one well skilled in following the directions of the unerring needle.

Yet again, the young of any quadruped the first time it finds itself plunged into water, if it be of age to have the strength for the requisite exertion, instinctively makes the necessary motions for supporting itself on the surface, and directing its course to the margin; swims, as we express it. So too, where the uncivilized people dwell near the coast or on the river bank, the young savage is customarily found, when scarcely yet more than a mere infant, able to swim, and even delighting to sport in the water. The following testimony is noteworthy:—"One day I had repaired to the stream for the purpose

of bathing, when I observed a woman sitting upon a rock in the midst of the current, and watching with the liveliest interest the gambols of something, which at first I took to be an uncommonly large species of frog, which was sporting in the water near her. Attracted by the novelty of the sight, I waded towards the spot where she sat, and could hardly credit the evidence of my senses, when I beheld a little infant, the period of whose birth could not have extended many days back, paddling about as if it had just risen to the surface, after being hatched into existence at the bottom. Occasionally the delighted parent reached out her hands towards it, when the little thing, uttering a faint cry, and striking out its tiny limbs, would sidle for the rock, and the next moment be clasped to its mother's bosom. This was repeated again and again, the baby remaining in the stream about a minute at a time. * * * * For several weeks afterwards I observed this woman bringing her child down to the stream regularly every day, in the cool of the morning and evening, and treating it to a bath. No wonder that the South Sea Islanders are so amphibious a race, when they are thus launched into the water as soon as they see the light. I am convinced that it is as natural for a human being to swim as it is for a duck. And yet in civilized communities how many able-bodied individuals die, like so many drowning kittens, from the occurrence of the most trivial accidents."—(Melville's 'Marquesas Islands,' p. 252.) No doubt there is involved in this case the influence of teaching; and, no doubt, that teaching is, in a sense, more intelligent than the presumed teaching of the bird or the beast to its young. But, admitting this, and recalling the exceedingly tender age of the children alluded to, and the failure that would be found attaching to an attempt to teach them something of a nature diverse from that bodily act which has been a habit of their progenitors for ages, it is impossible to assert that there is not here at least an approach to what is very like the hereditary instinct of the brute animal. This, at least, must be conceded, that the observed powers and peculiarities of the young savage, briefly adverted to above, must be accounted for either on the ground of pure or simple Instinct, or else on that of Hereditary Instinct. To me, I must confess, it appears that both are involved.

All that has been so far advanced applies to quite savage or uncivilized tribes, and much of it almost as strongly to more or less slightly civilized communities. And there are abundant materials for carrying out a series of similar observations to a considerable length. This, however, I forbear to do, alike from necessity and from a con-

viction that it would be a work of supererogation. I must not, however, altogether omit to notice the apprehension which all the families, and tribes and nations of the human race, in all ages and in all countries, have been found to entertain in some form or other, though possibly more or less disguised and obscured, of the existence of a Supernatural Being and of a future state of existence. This most remarkable fact is, with scarcely a dissentient voice, attributed to an inward utterance or impulse of Nature; that is, in other words, but with scarcely a shade of variation in meaning, the apprehension so universal, and so remarkable in its essential identity as well as its universality is an instinctive apprehension. And in so far as it is justly so called, it would tend to justify the expression, "An Instinct peculiar to man."

Such then are some of the observations and reasonings on which our first position depends for its substantiation; but, before taking leave of it, I may be permitted to append a few sentences from Sir B. Brodie's 'Psychol. Researches:'—"We cannot but suppose," we find him saying at p. 199, "that when man first began to exist, and for some generations afterwards, the range of his Instincts must have been much more extensive than it is at the present time. We see the infant first deriving nourishment from his mother's breast, but when the period of lactation is over, the experience of his parents supplies him with the fit kind of food derived from other sources. The absence of such experience must, in the first instance, have been supplied by a faculty which he does not now possess (but which we see manifested in the lower animals), directing him to seek that which is nutritious, and to avoid that which is not so, or which is actually poisonous. It is easy to conceive that much besides in the habits and actions of human beings, which seem now to be the results of experience and imitation, was originally to be traced to Instinct. And, indeed, there are many things which cannot well be explained otherwise. * * * * The majority of instincts belonging to man resemble those of the inferior animals, inasmuch as they relate to the preservation of the individual and the continuation of the species. To these the social Instinct is superadded, not indeed peculiar to man, but in him attaining a greater degree of development than in other creatures."

J. C. Atkinson.

Danby Parsonage, Grosmont, York,
March, 1858.

Reason and Instinct.—An excellent definition of the distinction between Reason and Instinct is, as at appears to me, one which I learned long since (when and whence it is impossible to recollect at this distant period), namely, that Reason varies its operations illimitably according to circumstances, whereas Instinct does not. This definition may perhaps be pronounced not strictly philosophical, but its clearness and simplicity (as well as accuracy) adapt it better for common persons and purposes than more abstruse propositions. I have added, I believe, the word *illimitably* to my original authority, because I am aware that instances may occasionally be noticed of extraordinary contrivance in animals, not merely among the higher orders, in meeting some change of their usual condition. But such departures from customary routine must be considered rather the acts of individuals, than as indicating any advance of their species generally; for I believe it to be an undoubted fact, and one which every close observer of animal habits must have remarked, that among irrational, no less than among rational creatures, different degrees of natural intelligence exist. Besides, even when superior animal talent (so to speak) does diverge somewhat from the ordinary track of its congeners, its powers of invention are speedily exhausted, and not equal to continued demands upon it, as would be the case with Reason. The tendency of these suggestions may be illustrated by some familar examples. The chaffinch, when constructing its nest, covers the outside with lichens so precisely similar in colour to the branch in which it is placed, that persons will pass repeatedly without perceiving it. But the bird, however often its nest may have been taken, will perseveringly build in a low tree or a bush, within reach of even children, instead of learning the greater security of a high tree. The house sparrow, again, in some respects very far from a stupid bird, yet appears particularly so in its nidification. The loose straws usually projecting from the nest render it one of the easiest to be discovered, and after it has been pulled completely down, the birds will immediately form another in the same place; which is so constantly their habit, that the alternation of framing and demolishing might be carried on through, perhaps, the whole breeding-season. When the sparrow builds, as it very commonly does, in a tree, its slovenly nest is not unfrequently blown down by a strong wind, in which case a new edition is forthwith produced, in the very same position, of exactly similar materials, and as utterly devoid, as the first, of any precaution against a misfortune like that which has recently occurred, nor will repeated accidents teach the expediency of such precautions.—*Arthur Hussey; Rottingdean, May*, 1858.

A Plea for Birds.—In the 'Times' of this morning there is an account of the appearance and destruction of a very rare bird, the hoopoe, which was shot by Mr. P. Matthews, of Ongar, on Wednesday last. Permit me a brief space to protest against this foolish and cruel act. The hoopoe (*Upupa epops*) is an unusual visitor to the British Isles, but has been met with in almost every county in England and in many parts of Wales. It is a most amusing bird in its habits, of peculiar and beautiful plumage, and, being entirely insectivorous, is perfectly harmless both in our gardens and orchards. They are numerous in many parts of Europe, particularly in the marshes near Bordeaux. They have been known to breed in this country, and would doubtless increase, but the moment they appear they are wantonly destroyed, as in

the instance above recorded. Owing to this spirit of persecution many species of birds which were once numerous in Great Britain have entirely disappeared, and year by year many of the Sylviadæ are becoming exceedingly scarce. Last spring a black redstart (*Phœnicura tithys*), being the first recorded in Hertfordshire, took up its abode in a friend's garden in this town, but it was destroyed notwithstanding our efforts to preserve it. It has been stated, and I fear with some truth, that the greatest enemies to birds are ornithologists, who should be their warmest friends. No sooner is a strange bird discovered than war to the death is waged against it, and happy the pseudo-naturalist who succeeds in depriving the wretched little wanderer of its life. His fame is duly chronicled in the county newspaper, and a skilful taxidermist employed to set up "the specimen," and exhibit it to his admiring friends. I am aware that all this is justified as being in the cause of science, but I would ask how is science advanced by the death of Mr. P. Matthews's hoopoe? If a specimen were wanted it could have been procured from France at the price of a few shillings. Last year, in a journal devoted to Natural History, there appeared a notice of a nightingale in Devonshire. Now, all naturalists are aware that, from some cause which we cannot explain, these sweet songsters seldom visit that or the adjacent county of Cornwall. One would have thought that its very unusual appearance there would have been hailed with delight, and so it was, probably, by most of the residents; but in an unlucky hour it was discovered by a naturalist, and—with indignation I write it—he barbarously and selfishly took its life. "I was fortunate," writes this cruel philomelicide, "to shoot it as it was singing on the topmost sprig of a hawthorn bush." I protest, as I write, I can hardly restrain my pen within the due bounds of courtesy, and I shall not trust myself to comment upon it. But I indignantly deny to those destroyers the honourable name of naturalists. To my mind, the great end and aim of the study of Natural History is to induce us to note the wonderful instinct by which each animal and bird procures its food, conceals and rears its young, and the adaptation to the situation and circumstances in which it has been placed by the Great Creator, and so to teach us

"To look from nature up to nature's God."

Nor do I consider that in any case we are justified in depriving these innocent creatures of their life, even though it were necessary in the cause of science.—*James S. Walker; New England House, Hitchin, Herts, April* 19, 1858.

Occurrence of the Hoopoe and Pied Flycatcher in Yorkshire.—I send you a notice of two scarce birds which during the last week have been killed in this neighbourhood: a male specimen of the hoopoe was shot at Witton Fell, near Middleham, on the 24th of April, an unusual time of year for this species to be procured in Great Britain; and on the 29th of the same month a pied flycatcher, also a male, was shot near Reeth, the first time the bird has come under my notice in this district.—*Henry Smurthwaite; Richmond, Yorkshire, May* 1, 1858.

Plectrophanes nivalis.—In the April number of the 'Zoologist' (Zool. 6015) Mr. Matthews states that a snow bunting was in the habit of perching upon a tall tree in a hedge-row. Surely this is a mistake. At page 281 of the 'British Ornithology,' Mr. Selby, in speaking of the snow bunting, says "they run with ease and celerity, like the lark genus, and *never perch on trees.*" I can confirm Mr. Selby's statement from my own observations: I have seen numbers of these birds on the coast of Essex, but in no instance have I ever seen one attempt to perch on a bush or

tree, but they will occasionally upon low, broad railings. I may also say that the pure black and white plumage is their summer livery, in which state they are very rarely seen in Britain. In winter the black feathers of the back are broadly edged with ferruginous, and the head, neck and all the under parts are strongly tinged with the same colour, becoming of a deep chestnut on the crown of the head and back of the neck; in the breeding plumage these parts are pure white. — *Henry Doubleday; Epping, April* 16, 1858.

[There is certainly a mistake in Mr. Matthews's statement, which it is important to correct. Was the pied flycatcher the bird that he saw.—*E. N.*]

The Ring Ouzel near Banff. — The ring ouzel (*Turdus torquatus*) appears to be getting much more numerous in this neighbourhood than it used to be. I have, this year, met with many pairs in places where I had never seen it before, and I have in one instance been fortunate enough to find a nest containing four eggs.—*Thomas Edward; Banff, May* 11, 1858.

Retention of Scent by the Partridge and other Game. — Reference having been made in the 'Zoologist' (Zool. 6014) to an opinion entertained by some persons, that game birds (should not the hypothesis be extended to all game animals, whose only defence is flight?) possess the power of retaining their scent, I will subjoin two anecdotes bearing upon the perplexing phenomenon of scent. Holding, myself, no theory upon the subject, I draw no conclusion, one way or the other, from what I have to relate, which I mention merely as facts, for the authenticity of which I will vouch. Though my own adventure occurred very long ago, it was in my native parish, and in a part thereof with which I was intimately familiar, beside that peculiar circumstances impressed the incident upon my memory, so that even now I could point out the locality, though I have not visited the spot for much nearer thirty than twenty years. With regard to the second story, which I know merely from the report of another, I may state that my informant was an intelligent, well-conducted person, whose veracity I have not the smallest ground for doubting. More than forty years ago I shot a cock pheasant, which fell winged in an open field, and ran straight for the opposite hedge, reaching and passing through it before overtaken by the dogs, which followed instantly, hunted him a little distance down the hedge, and then lost the scent, which they were unable to recover, when I joined them immediately after. Being convinced that the dogs (both very good, and even the youngest of some experience) would not have failed to regain the trail of the bird, fresh as it was, had he slipped away in any direction, after vainly trying all round for some time I returned to the place where the pheasant had come through the hedge, for the purpose of carefully examining it in the course the dogs had shown him to have taken, although the hedge, from having been closely browsed by sheep on both sides, was extremely thin, without grass or weeds at the bottom to cover even a lark. Before going far I espied the tip of my friend's long tail in a small hole, like a rat's, under an old stump of the underwood composing the hedge, and where, had I trusted solely to the noses of the dogs, the game might have remained in perfect concealment. In this occurrence it is to be remarked that the mere feet of the bird left sufficient taint upon the bare ground for dogs to pursue unerringly for a distance of (say) about fifteen yards, more or less; while no effluvium from the entire body of the pheasant passed out from its hiding-place to indicate its whereabout, though its enemies were eagerly seeking after it, with an interval of only a few inches between them. Moreover, and this deserves to be especially noted, no scent appears to have been left round the entrance of the

hole, which was so small that so large a bird must of necessity have pressed against the whole circumference of the orifice in forcing its body through. Very many years subsequent to the event related above, the gamekeeper of a friend in the Weald of Kent told me, that, when attending his master at some time previously, he had marked down a cock pheasant from the hill where he was standing, in a wood upon an opposite hill, but, upon reaching the spot, no pheasant, nor trace of a pheasant could be discovered, though the underwood being of only, I think, one year's growth, there was nothing to puzzle for a moment a team of, probably, from three to five well-trained Sussex spaniels. After searching fruitlessly for some distance around, in utter perplexity the man said, either aloud or to himself, "I am quite certain I saw the bird settle precisely at this bush," into which, as he spoke, he thrust a switch he carried, when the pheasant instantly rose from the very centre, where he had been lying quietly while his pursuers, men and dogs, were hunting for him, separated only by a few inches of twigs. In this case, if the dogs had been pointers or setters, very probably they would have detected the presence of the game, whereas spaniels, working with their noses close to the earth, were not aware of the vicinity of the bird, because he had dropped at once into the bush without leaving any trail upon the ground. When, however, we consider, that several trained dogs with very fine noses (which the old Sussex spaniels unquestionably possess) were seeking their own peculiar game, and aware they were expected to find some there (which good, experienced dogs will understand from the orders given them), it seems strange that they should not discover, nor even suspect how very near they were to their object, if the odour of the game had been as widely diffused through the atmosphere, as it certainly would be under ordinary circumstances: the pheasant, while resting upon the underwood-stock, might have been raised above the soil perhaps from nine to, in the extreme, eighteen inches. —*Arthur Hussey; Rottingdean, May*, 1858.

Small Variety of the Partridge.—Two of the correspondents of the 'Zoologist' have inserted short notices of the supposed variety of partridge, and in connexion with my paper on that bird, which I trust, they will think, justifies me in addressing this note to them. It would appear that their observations have been made on birds found in the same district and not in distant parts of it; as the one writes from Godalming, the other from Fowey, near Liphook. Will they permit me to draw their attention to the remarkable discrepancy in their several notices of the plumage of these birds? Major Spicer writes, "There is no difference of plumage that I can detect." (Zool. 6014). Mr. Waring Kidd, on the other hand, speaks of them as known to him and others by the name of "little black heath-birds," as being "invariably of a blacker colour" than the ordinary partridge; and accounts for their "dark colour" as originating in their food or part of it. (Zool. 6059). I do not know how far apart Fowey and Hindhead are,—I think not many miles,—and it certainly is an interesting fact, if these partridges differ so greatly and so commonly as the communications of the two gentlemen named lead us to infer. I confess when I saw in the 'Field' a sort of challenge thrown out for the production of those smaller birds,— the editor to be the judge,—and excuses instead of partridges were forwarded to that gentleman, I began to have great doubts as to their existence anywhere, except in imagination. I think the concurrent testimony of Major Spicer and Mr. Kidd, both of whom agree in stating the inferiority, in point of size, in comparison with the common bird to be about one-third, important; and that it is at least worth while to call their attention

to the discordancy of their statements as to the plumage of the partridges in question. —*J. C. Atkinson; Dandy Parsonage, Grosmont, York, March*, 1858.

Occurrence of the Broad-billed Sandpiper (Tringa platyrhynca) *for the third time in Norfolk.* — I have just purchased a specimen of this rare sandpiper, which was killed on the 23rd of April, near Yarmouth, I believe on Braydon Broad. This bird is a male, gradually assuming its summer plumage: the rufous edgings to the feathers appearing over the head, back and scapulars. The first British specimen recorded was also, according to Mr. Yarrell, obtained on the muddy flats of Braydon, on the 25th of May, 1836: the sex in this case was not ascertained. From that time no others had been noticed until a male, in very similar plumage to the one recently procured, was shot at the same place, and, singularly enough, on the same day of the same month, May 25th, 1856. In each case they appear to have been picked out from amongst dunlins and ring plovers.—*H. Stevenson; Norwich, May* 1, 1858.

Occurrence of the Glossy Ibis in South Wales.—I have received, for the purpose of preservation, a very fine specimen of the glossy ibis, killed on the 19th of this month, at Langharne Marsh, near St. Clears, Carmarthenshire, South Wales. Also, a male specimen of the gray shrike, killed at Loughton, Essex, on the 12th of this month.—*Thomas Hall; London Wall, April* 29, 1858.

Occurrence of the Dusky Petrel (Puffinus obscurus) *in Norfolk.* — A county that can claim the first British specimen of Steller's western duck, and more recently the only specimen of the capped petrel ever obtained in this kingdom, besides many other rarities, may be fairly considered without further additions a "rich ornithological district." I have the pleasure, however, of recording a not less interesting capture than either of those above-mentioned, in the fact of a dusky petrel, the true Puffinus obscurus, of Gould, having been picked up dead in this county. About the 10th of this month a strange bird was found dead by the gamekeeper, on the estate of Captain Meade, at Earsham, near Bungay. It was at once sent to a bird-preserver in this city to be stuffed, in whose possession I first saw it, but, unfortunately, not until it had been skinned and set up. Its smaller size at once distinguished this bird from the manx shearwater (*Puffinus anglorum*), and its exact resemblance to the figure of the dusky petrel in Mr. Yarrell's last 'Supplement,' added to the length and other measurements, perfectly agreeing with the description there given of this rare species, no doubt could well exist as to its identity. I might also state that the bird-stuffer having copied exactly the attitude of the bird as delineated in Yarrell, the resemblance, even at first sight, was more strongly marked. This specimen proved to be a male, but in very poor condition. It had evidently not been shot, but a wound on one side of the head, as though it had been hit, or had flown violently against something, was probably the cause of its being found dead. Except on the side of the head, as stated, the feathers were perfectly clean and unruffled, but the inner web of one foot was partially nibbled away, as though a mouse or some other vermin had been at it, luckily without doing further injury. It is particularly interesting, through this second appearance on our coasts, to establish the claim of this petrel to a place in our British list, especially since the first specimen had no stronger right to be so called, than the fact of its having flown on board a sloop near the Island of Valentia, off the south-west coast of Ireland. The following description of the plumage, in this instance, will be found to differ but little from that given by Mr. Yarrell, except that this bird is perhaps more in a state of change. Top and sides of the head, neck

above, upper tail-coverts, upper surface of the tail-feathers and of the wings dull sooty-black: the feathers of the back, including the scapulars, dark shining greenish black, each feather bordered by a very minute darker edging: the chin, throat, sides of the head below the eyes and including a narrowed rim over each eye pure white; as also the breast, belly and the under wing and tail-feathers: on the sides of the neck and passing downwards in front of the pinions, light grayish bars shading off into the white of the breast. Not having seen the bird in the flesh, I cannot speak as to the true colour of the beak and feet; the former is now dull black and the latter as to the webs yellowish brown.—*H. Stevenson; Norwich, April* 29, 1858.

Occurrence of the Kentish Plover near Penzance.—A female specimen of this little plover was killed on our flat sands to-day, and I have had an opportunity of examining it minutely in the flesh. I have a male specimen, killed here, but I never saw a female before, and I was somewhat perplexed in determining whether it was a female little plover at first. The following are a few particulars I have noted: weight $1\frac{1}{2}$ oz.: length from the beak to the end of the tail $6\frac{3}{4}$ in.: beak black: legs lead-blue: feet black: forehead pure white, extending partly over the eye, the purity then giving way to a reddish white passing over and behind the eye; the whole of the under parts unsullied white, the sides of the upper breast excepted, which have a patch of hair-brown, which in the male are black: the whole upper plumage from the top of the head to the centre of the tail pale ash-colour, the remainder of the tail nearly black: the shaft of the first quill-feather nearly white, the rest of the quill-feathers having the distal portion white, the remainder darker.—*Edward Hearle Rodd; Penzance, April* 17, 1858.

Occurrence of Wild Geese in the Isle of Wight.—A fortnight ago last Thursday, Mr. Murrow shot four Canada geese and two bernicle geese: a flock of eight came in Freshwater Bay; he went off in a boat, and in six successive shots killed six out of the eight. I have stuffed three of them: one of the bernicles will be sent to the British Museum by Captain Cockburn: I tried to buy the others, but he would not part with them.—*F. Rogers; Royal Hotel, Freshwater Gate, Isle of Wight.*

Supposed New Ammocœtes.—I beg to send you for insertion in the 'Zoologist' the following description of what I take to be a new species of a Petromyzidæ, perhaps an Ammocœtes. Should it prove so, that is if no one points out that I am wrong, I will name it and give its locality in a future number of the 'Zoologist.' In length it is about $6\frac{1}{2}$ inches; in girth, where thickest, $\frac{3}{4}$ths of an inch. In general form it is rather compressed than round, being only slightly so for about two inches of its length, where it then appears flattish, gradually narrowing towards the tail; but on the top of the head, and immediately above the eye, which is remarkably small, and almost hid in the centre of a small groove, there is an opening or orifice surrounded with a sort of lip of a beautiful yellow colour, beyond which and extending backward there is a small depression. Dorsals two, about half an inch apart; the first commences near the middle of the back, and is only a little over an inch in length; the other reaches to the caudal, to which it is united, and extends without intermission to about an inch on the under side, forming a sort of anal fin: the vent, which is about two inches from the end of the tail, has, like the orifice on the head, a kind of lip or fringe round

it. Branchial openings, eight on each side, are placed in a curved groove or canal. (In this respect it differs from all our Petromyzidæ, as yet described, so far as I am aware). The mouth may be said to be squarish, with the under lip depressed. There is no appearance of teeth, but numerous and very delicate cirrhi seem to supply their place. When fresh, it was on the top part of a most beautiful oil-green shading, and a dull yellow on the sides and belly: a bright yellow line runs along the middle of the back, beginning about an inch from the head, and extends round the caudal to the belly, dyeing the dorsals of the same colour. From the foregoing it will be at once apparent, that though it agrees in some respects with Ammocætes branchialis of British authors, still it differs very much in others. The eight branchial apertures and the squarish mouth are two most important distinctions, and cannot, I should think, allow it to be ranked only as a variety of the species just named. But as I have no wish whatever to augment species but on truthful grounds, I leave it to the readers of the 'Zoologist' to decide, if any of them will be kind enough to give their opinion.—*Thomas Edward; Banff, April* 14, 1858.

[This description has many points of extreme interest, and I sincerely hope that my ichthyological readers will endeavour to throw some light on the subject. The family Petromyzontidæ is made to comprise four genera, Petromyzon, Ammocætes, Myxine and Amphioxus: the connexion of the last of these with the other three is not very manifest. Petromyzon and Ammocætes have seven lateral orifices or gill-openings; in Myxine I believe that two only have been observed. The wonderful history of Myxine appears to me to require further elucidation. It seems incredible, and yet remains uncontradicted, that this worm-like fish should live within the bodies of living cod and haddock, having no other food than the proper substance, the muscle of these fishes, just as the larva of the ichneumon-fly feeds on the viscera or muscle of the living larvæ of moths and butterflies. I shall feel sincerely obliged to any naturalist who can, from personal observation, confirm, elucidate, or even refute this apocryphal-looking theory; as also to any reader who can identify Mr. Edward's description as applicable to any known species of the family Petromyzontidæ.—*Edward Newman*].

Descriptions of Two Unrecorded British Isopoda. — During a short trip to Plymouth and Polperro I met with the two following Oniscoids, which have hitherto escaped notice:—

Philoscia Couchii, *Kinahan.*

Body smooth. Head rounded, transverse, nearly straight across the front. The third ring produced into a small lobe beneath orbits. Telson (last ring of body) narrow, triangular. Apex obtusely rounded, fringed with four to six stiff spines; lateral margin distinctly excavated. Appendages of telson having the accessory appendage scarcely one-fourth the length of the ischium, which latter is elongate-subulate. Colour fulvous-gray, with patches of white. Runs with great activity, does not roll.

Habitat. — Among stones and decaying sea-weed near high tide-mark, at Tallant Cove, Cornwall, where it was in company with Orchestea littorea, Porcellio scaber,

Ligia oceanica, Lithobius forcipatus, &c. I have given it a name after the great illustrator of the Cornwall Fauna, Jonathan Couch, F.L.S., of Polperro.

PHILONGRIA ———, n. s.?
ITEA MENGII (*Zaddack*) ??

Body scabrous and tuberculated. Eyes very small and black, situated very laterally. Third ring produced into a small lobe on each side of the head, so as to give the effect of a lateral lobe. Internal antennæ long, three-jointed, very conspicuous. First to third abdominal rings granulated; fourth to telson smooth. Telson, apex truncate, not emarginate. Abdominal false feet same as in Philongria celer. Colour rose-red, with white median stripe, or white. Runs with great agility, does not roll.

Habitat.—Gardens and cellars, Plymouth, where I had the pleasure of first recognising this species in the collection of C. Spence Bate, F.L.S., who kindly pointed out the locality in which he had procured it, and where we found it abundantly. It so closely approaches Itea Mengii, as described by Zaddack, that I have refrained from giving it a name, as I can scarcely persuade myself that there must not be some mistake in his description of the "antennæ internæ" and rings of the abdomen: should this surmise prove correct the genus Philongria, as established by me last year, must give place to Itea of Koch, as limited by Zaddack, and Philongria celer will prove identical with either Itea riparia or Itea lævis, or perhaps with both. The granulations of the cephalo-thorax at once separate this species from that described by me last year as above.

Philoscia Couchii is easily known from the only other described species by the form of telson and abdominal appendages. My stay in Cornwall was so short that I am sure there were other species overlooked by me. Should any naturalist wish to follow up the subject, Mr. James Langhorn, of Polperro, would, I am sure, if applied to, willingly point out the locality named, as he was with me when I found the animal; his collections of preserved fish, crustacea, &c. would well reward a journey, even to Polperro.—*John Robert Kinahan; Donnybrook, Dublin, April* 30, 1858.

Note on the Paper by Messrs. Boyd and More "On the Geographical Distribution of Butterflies in Great Britain."—I was much surprised at observing in Messrs. Boyd and More's paper on the distribution of butterflies that the South Wales area, No. 6, was entirely unrepresented; and now that Mr. Scott (Zool. 6065) asks, has no one visited this portion of South Wales who can give us information? I venture to name the species that I have myself seen and taken.

Butterflies taken in Area 6, *in* 1856—57.

Pontia Brassicæ, Rapæ and Napi.

Pieris Cratægi. In great abundance; I found the larvæ feeding a fortnight since by thousands upon insulated shrubs of Prunus spinosa, eating out the centres of the unexpanded buds or basking in the sun upon their winter webs.

Anthocharis Cardamines. Common.

Gonepteryx Rhamni. Common.

Thecla Betulæ. I got six or eight specimens last year, and bred others.
Thecla Pruni. Most abundant.
Thecla Quercus. Plentiful.
Chrysophanus Phlæas. Common.
Polyommatus Argiolus. Common.
Polyommatus Alsus. Very abundant, but local.
Polyommatus Alexis. Everywhere.
Polyommatus Agestis. Local.
Argynnis Paphia. Plentiful.
Argynnis Aglaia. Less common than Paphia.
Argynnis Euphrosyne. By thousands.
Argynnis Selene. Very plentiful.
Melitæa Artemis. By thousands.
Vanessa Cardui. Not common.
Vanessa Atalanta, Io, Urticæ, Polychloros and C-album. Plentiful and widely spread.
Arge Galathea. By thousands.
Satyrus Semele, Janira, Tithonus, Megæra, Ægeria, Hyperanthus and Pamphilus. All very abundant on the hills.
Pamphila Linea and Sylvanus.
Syrichthus Alveolus. Sparingly.
Thanaos Tages. Local.

This list refers to a circle round Cardiff, say of ten miles radius, and results from very limited observations in two years, during which not one quarter of the ground indicated has been explored. — *Robert Drane; Guestwick, Norfolk, May* 1, 1858.

[I shall feel extremely obliged to the Rev. Mr. Drane for specimens of Thecla Pruni, which he mentions as occurring in an entirely new locality.—*E. Newman*].

Capture of Vanessa Antiopa at Stoke Newington.—On or about the 16th of September, last year, a specimen of Vanessa Antiopa was taken: both the wings on one side are injured by a piece having been taken out, probably by a bird.—*J. Rogers; Green Lane, near the Manor House, Stoke Newington, May* 12, 1858.

Capture of Vanessa Antiopa in Scotland. — Mr. Turner took a hybernated specimen in Scotland, in April: it is one of the largest and finest I have ever seen. —*Edward Newman.*

Is Artaxerxes a Species.—With regard to P. Agestis and Artaxerxes, I believe them to be merely permanent varieties or races of one species. There is no structural difference to warrant their separation; though I should never expect to rear a specimen of Artaxerxes from an egg deposited by Agestis or *vice versâ*. The description of the larva of Agestis sent me by Zeller corresponds exactly with that of Artaxerxes from this neighbourhood, and not at all with the description of the former larva in Stainton's 'Manual'; but Zeller's larva was certainly found on Erodium Cicutarium, while those of Artaxerxes feed on Helianthemum vulgare. We, however, so constantly find that the same species will subsist on many different plants, that the mere fact of difference in food cannot be considered of much importance; nor can the circumstance that Agestis is double-brooded, while Artaxerxes has only one brood in the year, either, have much weight, as many insects are only single-brooded in Scotland,

which are double-brooded on the Continent and in the South of England. There will still remain, however, a doubt upon the subject, until the transformations of both insects have been compared by the same individual; and I have never yet been able to induce any of our southern collectors to send me the larva of Agestis, which must be common, and easily found, where it occurs.—*R. F. Logan; Duddingston, Edinburgh, May* 17, 1858.

Occurrence of Thecla Rubi, Anthocharis Cardamines and Pieris Rapæ in Banffshire.—Whilst rambling last week in search of birds' nests, I was delighted and not a little surprised to meet with quite a colony of this pretty little green under-sided butterfly, but they were so active that I succeeded in taking but one out of eight or nine that I pursued. On the following day I met with another station for the same insect. Both the stations are high up on the hills, and a gentleman who resides in the vicinity told me they were met with there every season. Lower down, Pieris Napi and Anthocharis Cardamines were met with on lower ground in abundance.—*Thomas Edward; Banff, May* 8, 1858.

Occurrence of Deilephila livornica near Exeter.—The capture of Deilephila livornica is, I believe (particularly at this season of the year), of rare occurrence. It may, therefore, be worthy of a notice in the pages of the 'Zoologist,' that a male specimen of this insect was, on the 20th instant, taken at rest on the ground in a garden near my house, and is now on my setting-board.—*H. D'Orville; Alphington, near Exeter, April* 22, 1858.

Notodonta carmelita at Addington.—The park of the Archbishop of Canterbury has again been successfully searched for Notodonta carmelita, and this beautiful, but local species, seems likely to become general in collections: its season extends from the last week in April to the end of the second week in May, thus following the equally desiderated Aleucis pictaria.—*Edward Newman.*

Stauropus Fagi.—This insect, now so rare, has turned up in woods to the north of London this year, at rest on the boles of oak trees.—*Id.*

Endromis versicolor and Petasia nubeculosa.—Mr. Turner has just returned from Scotland with an abundant supply of these two beautiful moths. His collection of versicolor exhibits rather a remarkable feature, the males and females being in nearly equal numbers. Every insect has been pinned before it had taken wing, hence they are in the most perfect condition. He offers the versicolor at 5*s.* a pair, male and female; the nubeculosa at 30*s.* a pair, male and female.—*Id.*

Capture of Heliothis peltigera at Plymouth.—During a walk on the 18th of April I took a specimen of Heliothis peltigera, at rest on a stone in a steep bank near Plymouth.—*H. S. Bishop; Catherine Street, Plymouth, April* 27, 1858. —*Intelligencer.*

The Larva of Gnophos: is there more than one British Species?—The larvæ of this genus are now full grown: those which I am acquainted with feed by night on the rock cistus (*Helianthemum vulgare*), and may best be taken by searching late in the evening with a lamp, but a close search will reveal them by day, concealed under the leaves. Of the brown variety, common in this neighbourhood, I have known the transformations for some years; the lead-coloured insect, abundant on the upper part of the mountains in North Wales, has also been reared by our Northern entomologists,—the larvæ of this variety and their habits are identical with the Bristol insect. There are two varieties occurring in the Isle of Wight, on the South Downs and other places, one ashy-coloured in abundance, the other semitransparent and rarer: there is

also a very dark insect, abundant in the New Forest and on various heaths in the South of England. It would be very interesting to compare the larvæ of all the varieties and ascertain if any difference exists between them, or whether the great and constant difference in the colour of the perfect insects is merely attributable to soil. I have not used any specific names for the several varieties, as there seems considerable confusion among them.—*P. H. Vaughan; Redland, Bristol.—Id.*

Gnophos obscuraria.—Although it is quite true that all the specimens of Gnophos obscuraria taken on Parley Heath are of a dark colour, I do not consider that character sufficient to distinguish them as a species from the lighter-coloured ones. I took one specimen on Parley Heath, which, placed by the side of some of the darker specimens from Charmouth, would puzzle any entomologist to say to which species it belonged.—*J. C. Dale; Glanville's Wootton, near Sherbourne, May* 8, 1858.

[The following extract from the 'Entomological Magazine,' i. 515, dated October 1833, will show that the excellent entomologist who contributes the foregoing paragraph entertained and published the same opinion as to the extending the limits of this variable species twenty-five years ago, which is now gaining ground through the advocacy of that no less accomplished observer, M. Guenée. "I have taken Charissa serotinaria on a chalk soil, as in the Isle of Wight, for instance, and always whitish; C. pullaria, on stony chalk, at Dover, is rather darker; and another variety, on Portland stone, darker still; besides a variety at Monk's Wood, which appears intermediate. I have taken C. dilucidaria at Teignmouth, between grass and heath; and one, very nearly allied, on the Mendip Hills, out of furze and on old walls. C. obscuraria, which I have taken on Parley Heath, is very dark indeed. Is it not possible that all these are but one species?—*J. C. Dale.*"—*Edward Newman*].

Gnophos pullaria, &c.—I have before me larvæ of this insect, taken by Mr. Vaughan at Durdham Down, furnished to me by Mr. Greening, and also larvæ collected by Mr. Greening, Mr. Almond and myself at Llanferros, Denbighshire, and at Prenton, in Cheshire, and of some larvæ which I met with on Bidston Hill last week. Having paid much close attention to the egg, larvæ and imago of this insect, I have no hesitation in pronouncing the whole of these larvæ to be those of one variable species. It may be said, "So says Guenée;" but, however proud we may be of M. Guenée's admirable works, we must not take all for granted that even he says, as, for instance, Cheimatobia filigrammaria and C. autumnaria, which he gravely tells us are one species (simply because he was short of information upon this point) do not even appear in the same localities or within a month or two of each other; but, as it is more than probable that I shall have the larvæ of both species this season, I reserve my remarks for a time, merely observing that I already possess sufficient information respecting both species to warrant me in saying they are distinct. I may also observe that I have a full set of another equally distinct species (a birch feeder) in my cabinet, under the name Cheimatobia approximaria: the female of this species is even more distinct from either of the above species than the female of autumnaria is from the female of filigrammaria.—*C. S. Gregson; Stanley, May* 9, 1858.—*Intelligencer.*

Gnophos obscurata and G. pullata.—In Mr. Stainton's 'Manual' two species of the genus Gnophos are given as British, *viz.*, obscurata and pullata. Whether we have or have not more than one species, it is certain that the pullata of Treitschke, Herrich-Schæffer and Guenée, and which is considered to be the species intended by this name in the Vienna Catalogue, has not yet been found in Britain, and therefore the name ought not to be applied to either of the varieties or species found here. The

probability is that we have only one, varying, according to the locality, from a very pale gray to a brownish black; but the discovery of the larvæ of all the varieties will settle the question.—*Henry Doubleday; Epping, May* 13, 1858.

The Genus Oporobia.—In the 'Intelligencer' Mr. Gregson states that, in his opinion, we have four British species of this genus. I cannot agree with him, and think that my friend M. Guenée is right in reducing them to two, dilutata and filigrammaria. The Oporobia autumnata of Boisduval and Guenée does not appear to have occurred in Britain. O. dilutata is extremely variable in size and colour, and the Perthshire specimens are nearly double the size of those taken in the South of England. In this locality the late Mr. Weaver captured a species which has since been known by the name of autumnaria, and which differs from the Manchester and Arran specimens of filigrammaria in nothing but size, being much larger and exactly agreeing in this respect with the specimens of dilutata found in the same locality. I sent a long series of each sex of this insect to M. Guenée, and, after a careful examination, he came to the conclusion that it was only a local variety of filigrammaria. Mr. Edleston has since seen some of the specimens, and considers them the same as the Manchester species, but much finer. The first specimen I ever saw of this insect was given to me, many years since, by Sir William Jardine, and I was convinced that it was distinct from dilutata, although my late friend J. F. Stephens thought at that time it was only a variety. When in Paris, some time afterwards, I saw specimens of autumnata in the collections, and thought them identical with the one which I possessed. I had not the specimen with me to compare with the French ones, and it seems that I was mistaken. Mr. Edleston afterwards took the species near Manchester, and Mr. Weaver in Arran, and, more recently, the larger specimens near Rannoch.—*Id.*

Description of a British Eupithecia new to Science.—

EUPITHECIA VIMINATA, *Doubleday.*

E. *Alis omnibus cinerascentibus, anticis puncto minuto ordinario nigro; striga obsoletissima postica undulata alba.*

All the wings pale ashy brown, with the ordinary black spot in the centre of the anterior wings, but very minute, and a very indistinct pale waved line at the posterior margin. Posterior wings pale brown, with very faint undulated strigæ.

I sent this obscure species to my friend M. Guenée: it does not appear to be a variety of any named species, and M. Guenée considered the name viminata a very suitable one if the insect was really distinct, as it appears to frequent the osier. Having examined several specimens kindly lent to me by Mr. Greening, Mr. Bond and the Rev. P. H. Newnham, I have little doubt of the validity of the species.—*Id.*

Capture of Cucullia Chamomillæ near London. — I took a fine male specimen of this insect, in the neighbourhood of Hornsey, on the 9th instant. I have not heard of its being taken so near London before, or at such an early date. The specimen is in the collection of the Entomological Club.—*Thomas Huckett;* 26, *Britannia Row, Lower Road, Islington; May* 17, 1858.

Occurrence of Ephyra orbicularia at Lewes. — On Saturday evening last my son Walter had the good fortune to take a very perfect specimen of Ephyra orbicularia.—*Edward Jenner;* 2, *West Street, Lewes, May* 17, 1858.

Larva of Tephrosia Laricaria.—In a few remarks (Zool. 6067) upon the larva of

T. Laricaria, the editor very sensibly and naturally asks how I "recognise a larva of which no figure or description exists, indeed which no one has previously seen, and which I have not yet bred, to be that of Tephrosia Laricaria?" My reply is that I came to the conclusion that the said larvæ were those of T. Laricaria, and could be no other species,—*first*, because no other known larva of that size feeds upon the larch; *secondly*, because the size and general appearance resembled generically that of its congener T. crepuscularia, though still distinguishable; and, *lastly*, because the perfect insect is an inhabitant of Lancashire, where T. crepuscularia (at all events our pale ashy specimens) are rarely taken. I regret to add that every one of seven larvæ taken last September have, I fear, died in the pupa state, unless indeed they are ichneumonized.—*Henry Burney; Wavendon Rectory, near Woburn, Bedfordshire; May* 18, 1858.

[I feel much obliged for Mr. Burney's reply, but I cannot say that I regard his reasons as satisfactory: the proof that these seven larvæ were those of T. Laricaria seems to me as far removed as ever.—*Edward Newman.*]

Aleucis pictaria.—The pursuit of this insect has been very hot this year, and very successful; but the limits of the one locality now worked have not been extended. This is very singular, because the habits of the insect, crawling at the stems, or flitting about the white blossoms of the sloe, have for years been familiar to our best collectors. I believe Mr. Stevens was the discoverer of this secret, but, so great was his love of species preservation, that, to his credit be it spoken, I believe he never disclosed it. We have to thank that accomplished Frenchman M. Guenée, to whom Nature seems to reveal all her secrets, for making the fact known to the entomological public. Within the compass of my own limited information one hundred and twenty-eight specimens have been taken at Dartford Heath this year, the collectors on the ground being Messrs. Machin, C. B. Newman, Dow, Bouchard, Harding, Baldwin, F. O. Standish, Phipps (the son of "mine host" where the entomologists renovate the outward man), Tompkins, Wallace, Latchford, Barrett, Mitford and others. Two of these returned with empty boxes. Aleucis pictaria was first taken (in Britain) at Berechurch, near Colchester, where it was most abundant, rushing madly into the flame of candles whenever an open window or broken pane permitted of its performing this act of self-sacrifice at the shrine of Vesta. It has also been taken on the South Downs, in Sussex, where the straggling and stunted sloe bushes strive with the sea breezes.—*Edward Newman.*

Camptogramma gemmaria.—I had the pleasure to take one specimen of this rare species at a gas lamp near Dulwich on the 16th of April. It is not in good condition, and had probably hybernated.—*C. G. Barrett;* 37, *Park Street, Mile End, May* 12, 1858.

A Synonymic List of the British Trichopterygidæ.

By the Rev. A. Matthews, M.A.

The following synonymic list is an attempt to reduce the nomenclature of the British Trichopterygidæ into something like uniformity. I have endeavoured to accomplish this in the hope of rendering the

study of these curious little atoms more intelligible to a beginner, and of avoiding the confusion which now exists from the indiscriminate application of the same name to species widely differing from each other. For this purpose I have, to the utmost of my power, carefully compared the descriptions given by most of the authors referred to in the list with specimens of each species, and in many cases I have received the valuable assistance of my friend Mr. Waterhouse, who has with much kindness examined those works to which I had not the means of access.

I have made some alterations in the disposition of the genera, since it appears to me that this family is closely allied to the Brachelytra, not only in the external form and habits of the species, but especially in the dissections of the mouth, and that, in a general arrangement of the order, it should follow that extensive class. According to this idea the transition through Ptinella to the typical genus Trichopteryx is easy and natural, and, however impracticable as a whole a purely natural arrangement may be, I do not think it should be entirely lost sight of; and again, by placing Ptilium, Ptenidium and Nossidium at the end of the family, you leave this group, by an easy descent, either to Scaphidium or Choleva, to which in many points they bear an evident affinity.

With regard to the separation of Ptinella and some others from the genera with which they have been hitherto associated, I conceive that I am justified in thus dividing them by their great external dissimilarity; and where external characters are the almost only available points of distinction, they carry with them a weight which they would not otherwise possess. I much regret that, owing to the extreme rarity of many of these species, I have been unable to obtain dissections, as I believe that such an examination would fully sanction their separation. In order to avoid multiplying terms, I have adopted for these genera names previously used in the same family by Motschoulsky and other writers; but as these names were not in every case originally applied to the species to which I have assigned them, I subjoin descriptions of the genera and species now characterized for the first time.

I have, for the same reason, retained the name of Ptilium for the genus to which Erichson assigned it, as he appears to have been the first to publish its characters: all reference to Gyllenhal must however be expunged, as that author not only did not intend the name for any of the species to which it is now given, but actually assigns it to two species of Ptenidium, *viz.* pusillum and punctatum.

PTINELLA, *Mots.*

Antennæ articulis undecim, duobus basalibus maximis, cylindricis, sex sequentibus parvis, gracillimis, gradatim incrassatis, apicalibus tribus magnis, ovatis, terminali acuminata; caput magnum, latum, fronte obtusâ, pronoto profunditer insertum; pronotum transversum, anterius dilatatum, posterius valde constrictum, elytrorum humeris bene compactum; scutellum amplum, triangulare; elytra brevia, truncata, vix dimidium abdominis tegentia; abdomen amplum, elongatum, minime retractile, lateribus alte marginatis, segmentis quinque apertis, prioribus tribus æqualibus, penultimo magno, obtuso, apicali minimo; femora robusta, elongata; tibiæ compressæ, posteriores duo medio dilatatæ; tarsi exigui.

Formâ pronoti, elytris permulto brevioribus, et abdomine prælongo ac robusto ab omnibus aliis Ptinella differt.

PTERYX, *Matthews.*

Antennæ articulis undecim, duobus basalibus maximis cylindricis, tertio exigua, sex sequentibus ferme paribus, gradatim incrassatis, duobus apicalibus magnis, rotundatis; caput magnum, latum, fronte valde rotundatâ; oculi parvi; pronotum transversum, anterius contractum, posterius dilatatum, elytrorum humeris permulto latius; scutellum modicum, triangulare; elytra ovata, truncata, abdominis partes $\frac{2}{3}$ tegentia; abdomen ovatum, retractile, segmentis quinque ferme æqualibus apertis, lateribus haud marginatis; coxæ magnæ, posteriores parum dilatatæ; tibiæ longæ, paulo compressæ, posteriores indistincte calcaratæ, ac medio parum dilatatæ; tarsi longiores gracillimi.

Formâ corporis, præsertim pronoti, hoc genus Trichopterici assimilat, coxis tamen parum dilatatis, antennisque dissimilibus facile potest distingui.

Pteryx mutabilis, Matthews.

L. c. $\frac{3}{8}$—$\frac{7}{16}$ lin. Elongata, ovata, rufo-testacea, aureo pubescens, crebre ac fortius punctata; capite magno, rotundato; pronoto transverso, longitudini capitis vix æquali, anterius valde contracto, angulis rotundatis, angulis posterioribus rectis, margine posteriori et anteriori rectâ; elytris ovatis, ad humeros pronoto angustioribus, apicibus truncatis, ad suturam sinuatis; pedibus

atque antennis pallidis, translucidis, antennarum articulis coronâ setarum nigrarum ornatis.

Color speciei hujusce post mortem est varius, viventibus rufo-testaceus aut dilutior, aut intensior, sed post mortem varietatum harum aliam aut aliam adhibeat, videlicet,

Var. α. Ut in vitâ testacea, aut rufo-testacea, colore uno.

Var. β. Testacea, elytris translucidis, alâ utrâque plagâ nigrâ, mediâ, longitudinali, visâ.

Var. γ. Rufo-testacea, elytris subtranslucidis, capite, pronoto, apicibusque latis elytrorum, piceis.

Permultum dubito annon hæcce species T. suturalis D. Erichson atque aliorum sit, et ei tributam esse vellem, ni figura in Monographiâ D. Gillmeister determisset; cujus figuræ aliæ omnes adeo sint perfectæ, ut sit vix verisimile hac unâ falli.

Capta prope Weston in agro Oxoniensi.

Trichopteryx convexa, Matthews.

L. c. $\frac{1}{2}$ lin. Valde convexa, punctata, nigra, nitida, capite magno prominulo; pronoto valde convexo, posterius dilatato, leviter sed distincte punctato, ad basim lineâ punctatâ, transversali, profunde impressâ, marginibus lateralibus adjunctâ; lateribus ipsis leviter marginatis, et ad modum T. grandicollis rotundatis; margine basali subsinuatâ, angulis posterioribus ferrugineis, acutissimis, et valde productis elytrorum humeros amplexis; elytris brevioribus, longitudine pronoti vix excedentibus pallide pubescentibus, magis profunde punctatis, apicibus ferrugineis subrotundatis; antennis ac pedibus ferrugineis.

Formâ convexissimâ, et pronoti lineâ transversali ab aliis cognoscitur.

In agro Oxoniensi semel capta.

Micrus, *Mots.*

Antennæ pilosæ, articulis undecim, duobus basalibus elongatis, robustis, cylindricis; tertio exiguo, parti trienti sequentis vix æquali, quinque proximis æqualibus, elongato-ovatis, apicalibus tribus elongatis, gradatim incrassatis; palpi maxillares magni, articulis quatuor, basali minuto, secundo elongato, parum recurvato, tertio maximo ovato, apicali minutissimo, acuminato; caput magnum, latum; oculi prominuli; pronotum subquadratum, paulo anterius dilatatum; scutellum amplum, triangulare; elytra oblonga, truncata, apicibus fere rectis; abdomen

obtusum, segmentis quatuor apertis, prioribus tribus fere æqualibus, postremo maximo obtuso; pedes parum elongati, coxis anterioribus magnis posterioribus paulo dilatatis; tibiis posterioribus calcaratis, tarsisque brevioribus, gracillimis.

Formâ oblongâ et obtusâ, pronoto subquadrato, atque coxis minus dilatatis a Trichopterice hoc genus differt ab aliis autem coxis evidenter dilatatis elytrisque truncatis.

Titan, *Newman.*

Antennæ articulis undecim, basali maximo cylindrico, secundo magno orbiculato, sex sequentibus brevibus rotundatis, fere æqualibus, tribus ultimis majoribus rotundatis, apicali acuminato; caput magnum, fronte rotundatâ; pronotum transversum, posterius parum dilatatum, capite vix longius, lateribus rotundatis, angulis fere rectis; scutellum magnum triangulare; elytra abbreviata, quadrata, abrupte truncata, posterius parum dilatata, ad humeros pronoto parum angustiora; pedes breviores, coxis omnibus magnis, posterioribus haud laminatis, tibiis anterioribus dilatatis, intus calcaratis posterioribus quatuor robustis, tarsis mediocribus, articulis basalibus parum dilatatis.

Hoc genus coxis haud laminatis Trichoptericibus propriis differt, a sequentibus elytra brevissima ad distinguendum valent.

SYNONYMIC LIST.

Fam. Trichopterygidæ, *Haliday, Dub. Nat. Hist. Rev.* (*Proc. of Soc.* pp. 121—123; *Faune Francaise.*

Trichopterygia, *Gillmeister, Deuts. Ins. von J. Sturm.* xvii. Trichopterygia, *Erichson, Nat. der Ins. Deuts.* iii. 13. Ptilina, *Heer, Faun. Col. Helvet.*

Gen. 1. Ptinella.

Trichopteryx, p., *Gillm.* Ptilium, p., *Erichson, l. c.* iii. 31—33; *Guérin; Faune Francaise,* i. 338; *De Jean, Catal.* 3rd ed. 138. Omalium, *Waltl, in litt. test. Gillm.*

1. Britannica, *Matthews, Zool.* 6032.

Gen. 2. Pteryx.

1. Mutabilis, *Matthews.*

Gen. 3. Trichopteryx.

Trichopteryx, *Kirby, Int. to Ent.* iii. 40; *Stephens, Ill. Br. Ent.; Curtis, Guide; Erichson, l. c.* 18; *Heer, Faun. Col. Helvet.* i. 374; p., *Gillmeister, l. c.* 1; *Faune Francaise*, i.; *Haliday, l. c.* 122. Acrotrichis, p., *Motschoulsky; Wollaston.* Silpha, p., *Marsham.* Scaphidium, p., *Gyllenhal.* Latridius, p., *Herbst.* Dermestes, p., *De Geer.* Ptilium, p., *Sturm's Catal.; Motschoulsky.*

1. Grandicollis, *Erichson, l. c.* 20; *Haliday; Faune Francaise:* fascicularis, *Heer; Gillm.:* minutissima? *Marsh.:* atomaria, *Steph.:* lata, *Mots.*
2. Convexa, *Matthews.*
3. Fascicularis, *Herbst, Käf.* v. 8, pl. 41, f. 7; *Erichson; Faune Franc.; Haliday:* intermedia, *Gillmeister:* grandicollis, *Maerkel, Mann.*
4. Atomaria, *De Geer, Ins.* iv. 218, t. 8, f. 16—20 (*test. Gillm.*); *Gyllenhal; Erichson; Heer; Gillmeister; Faune Fr.; Redtenbacher; Motschoulsky; Haliday:* minima, *Marsham; Stephens:* flavicornis, *Waltl:* marina, *Motschoulsky: Var.* Chevrieri, *Allibert.*
5. Thoracica, *Gillmeister, l. c.* 48; *Faune Fr.*
6. Mollis, *Haliday, l. c.* 123, pl 3, f. 7.
7. Suffocata, *Haliday, l. c.* 123.
8. Brevipennis, *Erichson, l. c.* 21; *Faune Francaise:* clavipes, *Gillmeister:* picicornis, *Mannerheim.*
9. Sericans, *Schuppel; Heer, l. c.* 374 (*test. Gillm.*); *Erichson; Faune Franc.; Motschoulsky; Haliday:* depressa, *Sturm's Catal.; Gillmeister; Redtenbacher: Var.* volans, *var.* acuminatum, *var.* bovinum, *var.* brevis, *Motschoulsky.*
10. Pumila, *Erichson, l. c.* 22; *Faune Francaise; Haliday:* sericans, *Gillmeister:* Montadoni, rivularis, *Allibert:* longicorne, quadratum, *Motschoulsky.*
11. Similis, *Gillmeister, l. c.* 53.
12. Pygmæa, *Erichson, l. c.* 21; *Faune Fr.; Haliday:* parallelogramma, *Gillmeister; Redtenbacher:* Chevrolati, *Allibert.*

Gen. 4. Micrus.

Micrus, *Motschoulsky.* Ptilium, *Faune Fr.* i. 334.

1. Filicornis, *Faune Fr.* i. 338.
2. Pulchellus, *Allibert, in litt. Dom. Aubé* (*test. Gillm. l. c.* 95); *Faune Fr.*

Gen. 5. Titan.

Titan, *Newman.* Trichopteryx, p., *Heer, Erichson; Faune Fr. Gillmeister; Allibert; Haliday.*

1. Abbreviatellus, *Heer, l. c.* i. 375; *Erichson; Faune Francaise:* curta, *Allibert; Gillmeister; Haliday:* Titan? *Newman, Ent. Mag.* ii. 201.

Gen. 6. Ptilium.

Ptilium, *Erichson, l. c.* 24; *Redtenbacher; Comolli; Faune Fr.; Haliday.* Trichopteryx, p., *Stephens; Motschoulsky; Allibert; Mannerheim; Gillmeister.* Latridius, p., *Herbst.* Elophorus, p., *Gyllenhal; Weber & Mohr.* Ptinella, Micrus, Ptenidium, *Motschoulsky.*

1. Kunzei, *Heer, l. c.* 375; *Erichson; Redtenbacher; Motschoulsky; Gillmeister; Faune Francaise:* nana, p., *Stephens:* longicorne, *Waltl; Maerkel; Mannerheim:* spinipenne, *Comolli.*
2. Angustatum, *Spence, in litt.; Erichson, l. c.* 29; *Faune Fr.; Haliday:* oblongum, *Maerkel; Gillmeister; Redtenbacher:* rugulosum, *Allibert.*
3. Fuscum, *Waltl, in litt.; Erichson, l. c.* 28; *Gillmeister; Faune Fr.: Var.* fuscipenne, *Forster.*
4. Canaliculatum, *Maerkel, in litt.; Erichson, l. c.* 25; *Gillmeister:* minutissima, *Heer.*
5. Minimum, *Herbst, l. c.* tab. 44, f. 8 (*test. Gillmeister*): excavatum, *Maerkel; Erichson; Gillmeister; Faune Franc.; Redtenbacher:* foveolata, *Allibert:* limbata, gallicum, *Motschoulsky:* clandestinum, *Haliday.*
6. Coarctatum, *Haliday, l. c.* 122.
7. Minutissimum, *Weber & Mohr; Gyllenhal, Ins. Suec.* i. 136; *Erichson; Gillmeister; Faune Fr.:* trisulcatum, *Stephens; Aubé:* læsicolle, *Waltl.:* excavatum, *Haliday.*

Gen. 7. Ptenidium.

Ptenidium, *Erichson, l. c.* 34; *Redtendacher; Wollaston; Faune Fr.; Haliday;* p., *Motschoulsky.* Trichopteryx, p., *Kirby; Heer; Mannerheim; Motschoulsky; Allibert; Gillmeister.* Anisarthria, p., *Waterhouse; Stephens.* Scaphidium, p., *Gyllenhal.* Silpha, p., *Marsham.* Ptilium, *Schuppel* (*test. Gyll.*)

1. Pusillum, *Gyllenhal, l. c.* i. 189, iv. 293; *Erichson; Redtenbacher; Gillmeister; Faune Francaise; Haliday:* minutissimum, *Stephens:* nitidum, *Heer:* 4-foveolatum, *Allibert:* evanescens, *Marsham.*

2. Lævigatum, *Erichson, l. c.* 35; *Gillmeister; Faune Franc.; Haliday:* punctatum, *Stephens.*

3. Punctatum, *Gyllenhal, l. c.* iv. 293; *Faune Fr.; Wollaston; Haliday:* fuscicorne, *Erichson:* alutacea, *Gillmeister:* littorale, obscuricorne, *Motschoulsky.*

4. Apicale, *Erichson, l. c.* 35; *Sturm; Redtenbacher; Gillmeister; Faune Francaise; Haliday:* perpusillum, melas, *Marsham; Stephens:* nitidum, *Stephens:* evanescens, *Heer; Motschoulsky:* punctatum, elongatum, myrmecophilum, *Motschoulsky.*

Gen. 8. Nossidium.

Nossidium, *Erichson, l. c.* 17; *Faune Fr.; Haliday.* Anisarthria, p., *Stephens; Motschoulsky.* Ptilium, p., *Redtenbacher.* Dermestes, p., *Marsham.*

1. Pilosellum, *Marsham, Col. Brit.* 78; *Stephens; Erichson; Faune Francaise; Haliday:* nitidulum? brunneum? *Marsham; Stephens:* Ferrarii, *Redtenbacher.*

A. Matthews.

Gumley, Market Harborough,
May 15, 1858.

Remarks on the Sale of the Entomological Society's Exotic Collection: a Letter addressed to the President.

Dear Dr. Gray, Oatlands.

As you have taken no notice whatever of the only part of my letter which was particularly addressed to you, I suppose I must come to the conclusion that the Council do not mean, by a small act of grace, to extenuate a great injustice.

Unconvinced by your lecture, I stick to my text that you have done that which is neither lawful nor right.

The Society may, as you say, "derive great benefit from what it has done." It may prosper by the aid of that which I believe to be ill-gotten wealth; but I consider that its stability and good name went with the tattered fragments of the collection which was dispersed at the sale-room.

Before then I would not have presumed to compare my private collection with that of a Society, but since you have done so I accept the comparison. My life, in a

business point of view, may be worth fifteen or twenty years' purchase, and I suppose this is your notion of the duration of the Society since its fall. I see no further analogy between a public and a private collection. One is *known* to be of short duration, the other is *supposed* to belong to the future. My collection is my own, to dispose of as I please; yours was entailed and left to you in trust: mine, when I am done with it, will, I hope, be placed in the hands of those who have more regard for the feelings of others than the Council of the Entomological have shown.

You attempt to connect me, as an M.E.S., with the misdeeds of the Council. The fourteen days' notice of the sale, when the collection was already doomed and at the sale-room, was—or my memory fails me—the *only* notice which, as a member of the Society, I have ever had of the intentions of the Council, and this notice was sent me not by them, but by the auctioneers. Of the years of discussion of which you speak I have never heard one syllable, except by rumour. Until that fourteen days' notice was given my belief was that the better feelings of the Council had prevailed, and that the rumoured sale had been considered, as it ought to have been, an impossibility.

I am yours very truly,

W. C. Hewitson.

Reply to the preceding by Dr. Gray.

British Museum, May 12, 1858.

My dear Mr. Hewitson,

I have this moment received from you a note, without date, respecting the sale of the Society's collection, and as you inform me that you have sent it to Mr. Newman, as you did the former note, before it reached my hands, I reply through the same channel. I cannot agree with you that the Society has done anything "which is neither lawful nor right;" but I believe that they have acted in a most proper, regular and legal manner throughout, and with your implied sanction.

It is true that the Society hold the collection and other property in trust for the benefit of the members at large; but the trust has nothing to do with the persons who have presented specimens to the Society without any condition or reservation of any kind. I think you overlook the fact that the members of the Society who do not attend the meetings of the Society when duly invited are bound by the acts of those that do attend, and that you cannot excuse yourself because you have neglected your duties as a member.

My dear Sir,

Ever yours truly,

J. E. Gray.

Remarks on Dr. Gray's Note (Zool. 6070).

To the Editor of the 'Zoologist.'

Will you allow me to protest against the doctrine laid down in Dr. J. E. Gray's letter (Zool. 6070), *viz.* that public bodies stand on the same footing as individuals, with respect to the right of converting into money objects of Natural History that have been presented to them. Surely there must be general concurrence in Mr.

Hewitson's view, that Collections are given to public Societies *to prevent the dispersion of them:* gifts to individuals, for the gratification of friendly feeling, stand on a very different footing; yet, even in the latter case, the conversion of the gift into money would be generally deemed a most ungrateful proceeding. I know nothing more of the matter in dispute than what is to be collected from the two letters, and my sole object in troubling you with these few lines is to avert the discouragement of donations to public Institutions, which Dr. Gray's avowal that "their property must be liable to be distributed like that of a private individual" must necessarily produce. I most strongly dissent from the Dr.'s doctrine that *the legality* of the sale is the only question for consideration.

I am, Sir, yours obediently,

J. P. Wilmot.

Leamington, May 12.

[The discussion on this subject will now cease.—*Edward Newman.*]

Proceedings of Societies.

Entomological Society.

May 3, 1858.—Dr. Gray, President, in the Chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1856, Nos. 2—4, and 1857, No. 1; presented by the Society. 'Catalogue of the Lepidopterous Insects in the Museum of the East India Company,' by Thomas Horsfield, M. and Ph. D., F.R.S., Keeper of the Company's Museum, and Frederic Moore, Assistant, Vol. i.; by the Hon. Court of Directors of the East India Company. 'Proceedings of the Royal Society,' Vol. ix, No. 30; by the Society. 'Proceedings of the Zoological Society,' Nos. 339—349, both inclusive; by the Society. 'The Zoologist' for May; by the Editor. 'Abhandlungen de Mathemat-Physikalischen Classe der Königlich Bayerischen Akademie der Wissenchaften,' Vol. viii. Part I.; 'Ueber den Auban und Ertrag des Bodens im Königreiche Bayun,' Part I., by Dr. F. B. W. Hermann; by the Akademie. 'The Athenæum' for April; by the Editor. 'The Literary Gazette' for April; by the Editor. 'The Journal of the Society of Arts' for April; by the Society. 'List of the Specimens of Homopterous Insects in the Collection of the British Museum,' by Francis Walker, F.L.S., &c.—Supplement; by the Author. 'A Manual of British Butterflies and Moths,' No, 16; by the Author, H. T. Stainton, Esq. 'The Entomologist's Weekly Intelligencer,' Nos. 79—83; by the Editor, H. T. Stainton, Esq.

Elections.

Robert Mc Lachlan, Esq., of Park Road Terrace, Forest Hill, and Alfred Boot,

Esq., of Park Row, Greenwich, were elected Members; and Joseph Stevens, Esq., of Upper Richmond Road, Wandsworth, a Subscriber to the Society.

Exhibitions.

Mr. Majendie sent for exhibition a piece of beech bark covered with a white substance, which Mr. Westwood pronounced to be a secretion exuded from the body of the female of a species of Coccus, of which the male is as yet unknown.

Mr. Shepherd exhibited specimens of Stenus solutus, *Erichs.*, taken in the London district, observing that the species had been recorded as British in Mr. Waterhouse's recently published Catalogue, on the authority of a single specimen in the collection of Dr. Power.

Mr. W. F. Evans sent for exhibition living examples of the larva and imago of a species of the Rhynchophorous genus Prypnus, *Schoenh.*, which he had found in bulbs imported from the Cape of Good Hope.

Mr. Horace Francis exhibited various Coleoptera which he had met with in the vicinity of Folkestone, in September last, including beautiful examples of Anchomenus livens, *Gyll.*, and Ocypus (Goerius) cyaneus, *Fab.*

Mr. Janson exhibited the following Coleoptera, recently captured by him within a short distance of the metropolis:—

Oödes Helopioides, Fab., a species which he had not before taken, and which appears to be this year unusually abundant, having been found in considerable numbers in Kent, by Mr. Lewis, Mr. Douglas, Dr. Power and others: the series now before the Meeting were taken in the adjoining county of Surrey.

Badister peltatus, Panzer, a single individual found on the 19th of March last, under loose bark of willow, in the notorious Hammersmith, or, perhaps more correctly, Shepherd's Bush Marshes. The synonymy of and references to this species should be thus expressed: Carabus peltatus, *Panzer, Faun. Ins. Germ.* Fas. xxxvii. tab. 20 (1797), probably figured and described from a very immature specimen, with the head and thorax ferruginous, the elytra pale brassy, and the antennæ and legs entirely testaceous, a state of things so different from the ordinary aspect of the insect as to render identification, if not impossible, at least very problematical and unsatisfactory; *Illiger, Verzeichn. d. Käfer Preuss.* 197, 80 (1798); *Duft. Faun. Austr.* ii. 147, 193 (1812). Amblychus peltatus, *Gyll. Ins. Suec.* ii. 76, 2 (1810). Trimorphus Erro, *Newman* (*olim*), *Ent. Mag.* v. 489 (1838); *Steph. Man. Brit. Col.* 23, 134 (1839). Badister peltatus, *Sturm, Deutschl. Faun. Ins.* iii. 189, 3, tab. lxxvi. fig. a, A (1815); *Dej. Spec.* ii. 408, 4 (1826); *Iconogr.* ii. 226, 4, tab. 101, fig. 3 (1830); *Heer, Faun. Col. Helv.* i. 49, 3 (1838); *Erich. Käf. d. Mark Brand.* i. 24, 4 (1839); *Schaum, Ent. Zeit. Stett.* ix. 37 (1848); *Ann. and Mag. Nat. Hist.* 2nd series, iii. 35 (1849); *Newman, Zool.* 2276, 2277 (1848); *L. Redtb. Faun. Austr.* 82 (1849), 2nd ed. 31 (1857); *Dawson, Geod. Brit.* 61, 3, tab. 1, fig. C (1854); *Fairm. & Laboulb. Faun. Ent. Franc.* i. 63, 4 (1854); *Schaum, Naturg. d. Ins. Deutschl.* i. 352, 4 (1857).

Cossonus linearis, Linn., Schoenh., Steph., Walton. A species, judging from the old cabinets, frequently met with in Britain in days of yore, but which has probably not occurred for nearly twenty years, specimens having been taken by Dr. Power, in Cambridgeshire, about that period, since which apparently no instance is on record of its capture. The series now exhibited was taken a few days since in an old elm, which literally teemed with the insect in all its stages, the semi-decayed portions of the tree

being riddled in all directions by the larvæ, and the *débris* mingled with the remains of countless members of bygone generations.

Stenus solutus, Eric., captured at the same time and place as the specimens previously exhibited by Mr. Edwin Shepherd, to whom I am indebted for the opportunity of taking this scarce and local species.

Lathrobium punctatum, Zetterstedt, Faun. Ins. Lappon. i. 84, 5 (1828), to whom, and not to Nordmann, this species must be assigned, he having first elaborately described it under this name.

Mr. Westwood remarked that Cossonus linearis used to be taken in Battersea Fields.

Mr. Janson rejoined that it was certainly not there that he had met with it: little anxiety need, however, be felt as to the precise locality which had yielded it, as he had not only secured but set out an ample supply for all his friends, and specimens (a dozen if he desired them) were quite at Mr. Westwood's service.

Mr. Gloyne observed that he had taken a specimen of Oödes Helopioides on the banks of the Thames, near Mortlake.

Mr. Stainton exhibited a new species of Cemiostoma, bred by Mr. Wailes, of Newcastle-on-Tyne, from larvæ mining the leaves of Genista tinctoria, for which the name Wailesella had been proposed: the insect was closely allied to C. spartifoliella and laburnella, but smaller, and with a bluer tint than those species.

Mr. Westwood wished to know whether the larvæ of these closely-allied species fed on closely-allied plants; if so it was most probable that they were not distinct species, but merely modifications produced by the difference in the food plant.

Mr. Stainton observed that, independently of the differences in the larvæ and perfect insects, differences which truly were minute, there were differences of habit, especially between the larvæ, which would render it difficult to refer them to the same species; and to assume that because the differences were small, and because the larva fed on a different plant, the difference of food should so modify the insect in all its stages, seemed rather like begging the question: it was *possible* the effect of the food might be to alter the appearance of the insect, but that was certainly a point which required to be *proved* before it could be admitted.

Mr. Smith exhibited a Stylops which he had bred from a living example of Andrena fuscata, *Kirby:* it emerged from the pupa at half-past nine o'clock that morning, and although he endeavoured, by keeping it in as cool a place as possible, to preserve it alive to exhibit that evening, it died at about half-past four o'clock: he believed it to be the same species which he had lately figured in the Society's 'Transactions,' or certainly a very closely-allied species.

Mr. Smith also exhibited a piece of tube formed of vulcanized India-rubber, containing cells of the leaf-cutter bees: the cells were placed transversely in the tube, which he considered an extraordinary instance of sagacity in the bees.

Mr. Stevens exhibited some butterflies, taken in Amboyna by Mr. Wallace, including beautiful males of Papilio Ulysses, and the female of this species, the Papilio Diomedes, *Cram.*; also Papilio Codrus, and some fine Pieridæ.

Mr. Waterhouse exhibited the following Coleoptera, from the Collection of Dr. Power:—

Tachyusa sulcata. Taken at Southend.
Homalota orbata. Taken at Merton.
Agaricochara lævicollis. Taken at the Holt, Hampshire.

Oligota granaria. Taken at the Holt, Hampshire.

Xantholinus glaber. Taken at Holme Bush.

Quedius fuscipes. Taken at Addington.

Stenus solutus. Taken at Cowley and Lee.

Stenus ——— (sp. 20 of Mr. Waterhouse's Catalogue). Taken at Shirley. Mr. Waterhouse observed that this insect, in some respects (especially in the dark colouring of the palpi), more perfectly agreed with the description of S. providus, *Erichs.*, than did the species which he had supposed was that insect, and which, from its more cylindrical form, he now thought might prove to be Kraatz's S. Rogeri. Before, however, this point could be settled, it would be necessary to ascertain the sexual characters of Dr. Power's insect, of which one specimen only had been found.

Philonthus signaticornis. Taken at Eastcot and Merton.

Philonthus nigrita. Taken at Eltham.

Philonthus pullus. Taken at Portsea.

Philonthus lepidus. Taken at Deal.

Mr. Waterhouse also exhibited the following species from his own collection:—

Oxypoda aterrima, nov. sp.

Anisotoma obesa, Schmidt, *A. ciliaris*, Schmidt, *A. brunnea*, Sturm, *A. parvula*, Sahlb.

Cyrtusa minuta, Ahrens.

Agaricophagus cephalotes, Schmidt.

Leiodes orbicularis, Herbst.

Euthia plicata, Gyll., *E. truncatella*, Erichs. First taken by Mr. Whittingham at Leytonstone, and subsequently by Mr. Waterhouse at the Crystal Palace.

Mr. Waterhouse read the following description of the new species of Oxypoda exhibited by him:—

"Oxypoda? aterrima.

"O. *linearis, aterrima, nitidiuscula, antennis pedibusque piceo-nigris, thorace elytrisque crebre punctatis, abdomine parcius punctato; thorace coleopteris longitudine subæquale, basi foveola impresso.* Long. corp. 1 lin.

"This little insect is extremely like Homalota analis, but is usually a trifle larger: the antennæ are distinctly shorter, a little stouter, and with the intermediate joints strongly transverse; the head rather more globose and less suddenly constricted behind; the thorax rather less transverse, but in other respects like, with the same posterior fovea and indistinct dorsal channel; the punctuation, however, of this part, as well as of the elytra, is rather stronger: the elytra are very nearly equal to the thorax, both in width and length, and present scarcely a trace of the posterior notch: the abdomen is rather less finely and less thickly punctured than in H. analis; the three visible segments nearest the elytra are transversely impressed at the base; the jaws are testaceous; the palpi dusky.

"Several specimens of this insect have been taken by Mr. Morris Young near Paisley: its general appearance is so like that of a Homalota (especially H. analis) that I was much surprised, upon placing it under the microscope, to find five joints to the fore tarsi, and this character accompanied by a somewhat elongated basal joint to to the posterior tarsi: this joint, however, though decidedly longer than the following joints, is less elongated than in most of the Oxypodæ."

Mr. Westwood exhibited a drawing of a dark variety of Acronycta Ligustri, and of the larva from which it had been bred by Mr. Henry Boyle.

Captain Cox sent for exhibition a portion of a hop-pole perforated by the larva of a Coleopterous insect, apparently a Callidium.

Mr. Stevens communicated the following extract from a letter written by Mr. H. W. Bates, from Sto. Paolo, Upper Amazons:—

"On arriving at this station, one of the first new acquaintances in the butterfly department which greeted me was the very beautiful Pandora Prola, *Boisd.*,—at least I suppose it to be this species, from the nearly spotless scarlet colour of the under surface of posterior wings; it was flying wildly about the streets of the village, entering houses by the windows and settling on the walls: since then I have always seen one or two on every very hot sunny day: the species does not penetrate the forest; it is found only about the houses, and at a spot on the borders of the forest where the vultures roost: its habits altogether are unlike those of any other species of Nymphalidæ; it settles frequently, sometimes on the ground, attracted by offal, but frequently on the trunks of trees, bare walls, &c., holding in repose its wings slightly raised: it is excessively wary, and only during the very hottest weather allows itself to be approached: I have captured several on my own person, as, when standing about waiting an opportunity to obtain it, it is apt to sail up boldly and settle on one's clothing; its habit of settling on the trunks of trees and its bold rapid style of flight very much resemble the manner of the Ageroniæ, and I am quite satisfied that the true position of the genus Pandora is in proximity with Ageronia. There are two grand species of this latter genus new to me also found here, one of which has the greater part of the under surface of the hind wings red, and the other has the same part saffron-yellow: they fly in company with Pandora at the place on the borders of the forest, but do not wander so far in their flight. I wish to mention here that I think there is quite an erroneous conception established by lepidopterists, of the nature and affinities of the Ageroniæ. M. Lacordaire and Mr. Wallace have said that the chrysalis is secured by a ligature round the body; I think there is some mistake about this: I have bred two species of the genus, and most certainly the chrysalis is suspended by the tail like all the other Nymphalidæ. In our systems the Ageroniæ are placed at the head of the Nymphalidæ, near the true Papilionidæ, as though forming the connexion between the families. I think all this is a misconception. There is no proximate affinity at all between the Papilionidæ and the Nymphalidæ; the two families are separated by the whole mass of the Erycinidæ. I should as little expect to find an Ageronia chrysalis with a ligature round the body, as a true Papilio chrysalis suspended only by the tail. The larvæ of Ageronia are spinose; the lines of thoracic segments densely ramose. In their flight they make a smacking noise with their wings like the clicking of castanets, but rarely repeated. The Pandora does not produce this noise."

The Secretary read the following paper by Mr. A. R. Wallace:—

A disputed case of Priority in Nomenclature.

"Allow me to call the attention of the Entomological Society to what seems to me a novel and most erroneous as well as inconvenient interpretation of the law of priority: it is, that of transferring a name long borne by one insect (but which it has lost by being found to be but a sex or variety) to another insect which has been erroneously

referred to the same species. This has been done by the late Mr. Doubleday, who has changed Ornithoptera Remus, a name which for fifty years has been invariably borne by one well-known species, into O. Panthous, a name which for a still longer period has been applied to the female of O. Priamus. Such a change would be most inadvisable, even were the principle on which it was made a good one; whereas it is one which gives, at it were, a premium to error. Linnæus described the female of Priamus as a distinct species (Panthous) and Remus as the male of Panthous. Cramer corrected the latter error and figured the two sexes of Remus correctly, giving the species for the first time a distinct name. This name it appears to me cannot be changed for that of Linnæus, who erroneously supposed the species to be the same as one he had previously named, although that name has been reduced to a synonym. The two errors of Linnæus should not be allowed to take precedence of Cramer, who first correctly named the species. The question here raised is of importance because an analogous case is now open for decision. P. Darsius of G. R. Gray was previously figured by Doubleday as the male of Amphimedon. Now, Amphimedon is certainly the female of Helena, and, if the rule holds good, the new species Darsius must take the old name of Amphimedon, just as Remus has been made by Messrs. E. Doubleday and G. R. Gray, to take the name of Panthous. Such a practice will certainly not be generally followed, and I would humbly suggest that it is one of the duties of an Entomological Society, to check, by an expression of their opinion, all that tends still further to confuse the nomenclature and synonymy.

"Amboyna, January 1, 1858."

The Secretary read "Descriptions of six New British Neuroptera sent by Mr. Dale to the British Museum," by Dr. Hagen; and the following paper by Mr. Newman:—

Note on Scolytus destructor.

"Having heard from Mr. Stainton that the Royal Botanic Society had awarded a gold medal to our fellow-member, Captain Cox, for certain successful experiments in recovering elm trees from the attacks of Scolytus destructor, I was delighted to receive for the press that elaborate paper with which the Society was favoured at its last meeting. That paper is published in our 'Proceedings,' and will afford to the world abundant proof that we are now regarding Entomology in a utilitarian as as well as a scientific spirit. 'It is,' as the writer observes, 'peculiarly fitting that Science should step in and prove that over one pest at least we have power, and if not made use of the fault lies entirely with the public.' I cannot sufficiently regret my absence from so interesting a meeting, since, had I been present, I should have endeavoured to elicit still further information from a gentleman who has so successfully studied this important branch of rural economy; more especially, as the Parisians, in their bungling attempts to employ the draw-shave, have sacrificed the finest elm trees around the French metropolis. I may perhaps be allowed to state, touching the bibliography of Scolytus destructor, that I think Captain Cox scarcely goes back far enough, when he dates the knowledge of its economy from 1840: previously to that year the late M. Audouin had thoroughly mastered its history; and six years earlier still, an obscure writer in the 'Entomological Magazine' (i. 425), under the assumed name of 'Rusticus':—the habit of assuming names cannot be sufficiently reprobated—described its economy so minutely as to induce the idea that Captain Cox must have

been at the writer's elbow even while he held the pen, and dictated what he wrote: before Rusticus, Kirby and Spence seem to have been cognizant of its doings; and to go back still further, the very name carries with it an idea of some knowledge of its economy. Captain Cox has, however, added one most interesting fact overlooked by previous writers: that 'the female dies at the entrance of her tube, thus performing a maternal duty by closing the aperture to her young ones with her own dead body.' The points, however, on which I would solicit for the Society additional information are these: Captain Cox states his firm conviction that healthy trees are attacked by Scolytus; and that this insect is the cause of premature decay and eventual death. He narrates with great perspicuity that eighteen dying elm trees were placed at his disposal, that he experimented on every one of them, by taking off the surface bark with a draw-shave; and that seventeen out of the eighteen completely recovered: the the operation is most simple, and I believe every one will admit that its very simplicity adds to its beauty and its value. Before commencing his experiments, Captain Cox numbered the trees from 1 to 18, and made a careful memorandum of the state of each; the summary of these memoranda may be thus briefly stated. Fifteen were suffering severely from the ravages of Cossus ligniperda; and out of these fifteen, nine were also infested with Scolytus: three, making up the eighteen, were attacked by Scolytus, but all these three "slightly." Now, to a superficial observer, it will occur that the state of the trees, scarcely bears out the author's own conclusion as to Scolytus attacking sound trees, since fifteen out of the eighteen were manifestly attacked by the most deadly enemy that a timber tree can possibly have: and to a *superficial* observer, I purposely repeat this qualifying expression, nothing can present a more sickly or abnormal appearance than a tree, the solid timber of which is riddled through and through by the enormous larvæ of Cossus ligniperda: such trees, with or without the smaller pest, I should have unhesitatingly pronounced in an unhealthy state. When Captain Cox favours us, as I doubt not he will, with an explanation of this apparent inconsistency, arising probably from some accidental oversight or transposition of words, may I ask him to reexamine the larvæ which he denominates those of Cossus ligniperda, and which had so severely injured the fifteen trees under consideration; because I never happened to find that insect feeding on elm, and had not the statement been made by an entomologist who possesses an unusually extensive knowledge of the larvæ of our British Lepidoptera, I should have fancied that the trees were dying from some other and undiscovered cause. One other slight difficulty occurs to me which will, doubtless, be removed without causing any additional or unnecessary trouble to Captain Cox. Seeing that the larva of Cossus mines the solid wood, and not the bark, except in its very juvenile state; and seeing that the fifteen Cossus-mined trees completely recovered after their outer bark had been merely draw-shaved, how is it to be explained that this simple external process affects the deadly Cossus deep in the interior? The author has not explained this, probably concluding that entomologists were more intimately acquainted with the reciprocal offices of bark and solid wood, than I fear is the case. I trust that these queries, unimportant in themselves, will not be deemed irrelevant, but will acquire some importance from the acknowledged importance of the subject; I hope they will induce Captain Cox to enrich our 'Proceedings' with a second paper still more explanatory than the first. As an observation on Scolytus, quite independent of the paper to which I have been alluding, it is rather interesting that in the two great London colonies of this insect, Greenwich Park and Camberwell Grove, its advent

dated two years subsequently to the introduction of gas, and its ravages have not yet extended beyond the reach of the gas influence: that gas has an injurious effect on elms is a self-evident fact, so probably have all gases evolved by combustion in factories, since we always see elms in manufacturing cities losing their leaves six or seven weeks earlier than in the country: in this weakened state trees are particularly obnoxious to the attacks of insects, and about London elm trees are generally infested with the larvæ of Scolytus destructor and Zeuzera Æsculi. I am well aware of the alleged fact of the trees in the Hartz forest and elsewhere in France and Germany being destroyed by Scolytus, still the coexistence of elm failure and gas-lights must remain an indisputable fact, although at present a fact from which no general conclusions can be safely drawn."

Mr. Westwood observed, with reference to the latter part of Mr. Newman's paper, that the Scolytus was abundant in Christ Church Meadows, Oxford, far away from gas-lights."

Proceedings of Natural-History Collectors in Foreign Countries.

Mr. A. R. Wallace.*—"Amboyna, December 20, 1857.—My collecting this year has been so peculiar and so different from anything I have yet done in the tropics that I must give you some little account of it; my locality was at the foot of the mountains about thirty miles north of Macassar, the whole country between this range and the sea is a dead level of paddy fields, flooded for half the year, and of course absolutely barren of insects; the mountains are of limestone or basalt, the former rising from the plain in immense perpendicular walls quite inaccessible, except where a few streams break through them; the basalt hills are more rounded, and at the foot of one of them is a forest of palms and jack fruit. I had a small bamboo house built; when I arrived in August there had not been rain for two months and it was fearfully hot and parched; dead leaves strewed the ground, and a beetle of any kind was sought for in vain. After some time I found a rocky river-bed issuing from a cleft in the mountains, and though dry it still contained a few pools and damp hollows; these were the resort of numerous butterflies,—Papilio Euryphilus, the new species near Sarpedon, P. Rhesus, P. Peranthus and the rare P. Encelades, *Bois.*, the beautiful Pieris Zaranda was rather abundant, and several interesting Nymphalidæ. Here, therefore, I made daily excursions and procured good series of many of these insects; the paths in the forest adjoining this stream were pretty abundant in Ornithoptera; of two species, O. Remus and the very rare

* Communicated by Mr. S. Stevens.

O. Haliphron, *Bois.*, both sexes of which I took, and twice *in copulâ;* the female something resembles O. Amphimedon, which is the female of O. Helena. About the mud holes Hymenoptera were abundant and on the fallen palm stems; in dry gulleys, &c. were many very curious Diptera; Coleoptera, however, were not to be found: I searched dead trees, and bark and leaves, with no other reward than a very few species of minute Curculios and obscure Chrysomelidæ. After a few weeks of this work the mud holes got baked hard, the pools of water disappeared one after another, and with them the butterflies and other insects, and for some days I got almost nothing. I now set to turning over the stones and dead leaves in the sandy river-bed, and soon found that there were some minute Coleoptera under them, namely, Anthici and very small Carabidæ; to catch them I made my boy bring a basin of water and a spoon, and by shovelling in the sand I could pick off the insects which floated on the surface: in this way I got many Carabidæ, the largest not more than $1\frac{1}{2}$ line; two or three species of Anthicus and some Steni and other Brachelytra. I now turned my attention to buffalo-dung, which, though very barren compared with genuine British cow-dung, would I found yield something to a persevering search,—I obtained Histers, Onthophagi, and a considerable number of minute Staphylinidæ. A few days, however, soon exhausted this collecting-ground, for, except in the river-bed, the dung was absolutely uninhabited, when chance showed me a new and very rich beetle station. My lad brought me one day a fine large Nitidula which he had found in an over-ripe jack fruit (*Artocarpus* sp.); this set me to searching these fruits, of which there were a number about in various stages of decay, and I soon found that I had made a discovery, — Staphylinidæ, large and small, Nitidulæ, Histers, Onthophagi, actually swarmed on them: every morning, for some weeks, I searched these rotten fruits, and always with more or less success; I placed ripe ones on the fruit here and there, which I visited once a day, and from some of them got even Carabidæ; in all I found not much short of one hundred species of Coleoptera on the fruit, including most that I had before found in dung, so that it seems probable that, in tropical countries, the large fleshy fruits in a state of decay and putrescence are the true stations of many of the Carpophagous and Necrophagous Coleoptera, a fact of some importance, as explaining the presence of Onthophagi, &c. in places where there are no ruminating animals: at length the rains began to fall almost every evening, and the fruits, soaked with water, ceased to be productive, but I was compensated by discovering that

the margins of the streams, which when dry were so rich in Lepidoptera, were now an excellent collecting-ground for small Coleoptera; under the moist dead leaves that lay on the rocks I found numbers of small and very interesting Carabidæ, with hosts of Anthici, and a good many Pselaphidæ and Hydrophili: with the rains the butterflies almost disappeared, while the Cicindelidæ came out in great abundance, four species being different from those I took last year; small Melolonthidæ also now became abundant on the foliage, and I took two or three species new to me, with several pretty Chrysomelas and Curculios. After a fortnight's close work at minute Coleoptera, the weather became so wet and cloudy, as to admonish my return to Macassar to pack my collections before the commencement of the continuous heavy rains.

To persons impressed with the idea of the prevalence of large insects in the tropics, my Macassar collections will appear most extraordinary; the average size is certainly less than that of our British species, and the colours not at all more brilliant. Of the Carabidæ (more than one hundred species), the greater part are under 4 lines and a very large number under 2 lines, whilst several under 1 line are perhaps the smallest of the family: the Brachelytra (eighty or ninety species) are, with the exception of about a dozen, very minute and obscure: the Rhynchophora are all small, and there are about one hundred species of minute Necrophaga, Xylophaga, &c., and about eighteen species of the elegant little Anthici, whilst the Longicornes, Buprestidæ and Cetoniæ, usually so abundant, are very scarce: if we were to take away some dozen purely tropical forms, the collection would have all the appearance of one from an extratropical and even northern locality, owing to the large proportion of Carabidæ, Staphylinidæ and Necrophaga, the small average size of the species and the obscurity of their colours.

Amboyna, where I am staying a month only, on my way to Ternate, offers a striking contrast to the country I have just quitted: it is eminently tropical; the number of large and handsome species in all orders of insects is perhaps greater than in any other place I have visited, and the forms far more closely resemble those of Aru than of Borneo or Macassar; a number of the common species of the surrounding island are represented at Amboyna by others very closely allied or by varieties, but in almost every instance they are of larger size and more brilliant colours,—Papilio Severus and Ulysses are larger here than at Aru, whilst Deiphobus is larger than the closely allied Memnon of the Sanda Island or Ascalaphus of Macassar. In

the Hymenoptera, the species of Vespidæ and Pompilidæ are gayer than the allied species I have found in other countries; a Laphria and an Anthrax are larger than any Diptera I have yet found of the same genera; while the Coleoptera include the gigantic Eucheirus longimanus and a number of large and handsome Longicornes, Buprestidæ and Anthribidæ: it may be easily imagined, therefore, that Amboyna is a tempting place, well worth a thorough exploration, and I shall probably return to it unless I shall be able to visit Ceram, which I expect will contain almost all the Amboyna species, and probably many more, as is known to be the case with the birds. Though everybody says this is the dry and hot season, yet the weather has been terribly wet and windy, and during the twelve days I have now resided in a little hut in the jungle I have not had a single hot sunny day; here, as everywhere in the East, there is no forest left for many miles round the town, and there was the usual difficulty in finding a locality and a home, and in conveying my baggage. In the town I reside with Dr. Mohinke, the chief physician of the Moluccas, a German, an entomologist, and a very learned and hospitable man; he has lived in Japan, made a voyage to Jeddo, ascended volcanoes, and made collections: my pleasure may be imagined in looking over his superb collection of Japanese Coleoptera, large and handsome Longicornes and Lucani, tropical Buprestidæ and northern Carabi: he has also an extensive collection of Coleoptera made during many years' residence in Sumatra, Java, Borneo and the Moluccas — a collection that makes me despair; such series of huge Prioni, Lamiæ and Lucani, Dynastidæ and Eucheirus! It is such collections that give, and have always given, such an erroneous idea of Tropical Entomology: these collections are made entirely by natives. Dr. Mohinke has resided here in Amboyna, for example, *two* years, and every native in the island knows that large and handsome beetles will be purchased by him; he has, therefore, hundreds of eyes spread over hundreds of square miles, and thus species which in ten years might never once occur to a single collector, are inevitably obtained by him in greater or less abundance, whilst the smaller, more active, and much more common species are never brought at all. The Eucheirus is evidently rare, yet Dr. Mohinke has a fine series, obtained at intervals from different localities; he also sends bottles and casks of arrack to the Dutch officers resident in different islands, and though he sometimes has them returned crammed full of a single species of common Calandra or Passalus, yet he occasionally gets some magnificent insects. I believe myself that, as a general rule, beetles are

rare exactly in proportion to their size, rare both in species and in individuals; in four years' almost daily search in the Eastern forests I have never found a large Prionus myself, and I have collected nearly four thousand species of Coleoptera: such collections as those of Mr. Bates and myself, made in such distant countries (both generally considered among the richest in large species), are what show the true nature of tropical insects, and I believe that a careful examination of these will lead to the conclusion that there is no superiority whatever in the average size of tropical Coleoptera over those of temperate climates, and that in many groups the latter have the decided advantage.

A. R. Wallace.

Scent: an attempt to explain its Properties and Causes.

By the Rev. J. C. Atkinson, M.A.

It is my purpose in the following remarks to record a few observations on the subject of Scent, with the view of leading, if possible, to further observation and inquiry into a matter generally thought, I believe, to be involved in a good deal of obscurity and uncertainty.

By scent is implied what is assumed to be an odour emanating from any specified member or members of the animal kingdom; and is, in sporting language, so far restricted in its sense as to be applied almost exclusively in the case of such animals as are the objects of pursuit in the chase or by the shooter; and, almost as exclusively, with reference to the olfactory powers of some one or other of the varieties of the dog. However, in attempting to institute an inquiry into the nature or peculiarities of Scent, it will be certainly most convenient, and possibly quite necessary, to include under that term the odorous emanations proceeding from any animal whatever, and perceptible to the sense of smell in any other animal whatever.

It is probably true that there is no existing animal without its own peculiar scent. Thus, "in most Mammalia," says Dr. Carpenter, "an odoriferous secretion, characteristic of the particular species, is formed by glandulæ which pour out their product on some part of the surface, their situation however being extremely variable in the different tribes; this secretion is usually formed most abundantly at the period of sexual excitement, and appears to be concerned in the attraction of the sexes towards each other." (General and Comp.

Phys. 448). And it is almost certain that the same remark may be extended so as to include at least all terrestrial creatures and not a few of the aquatic.

In a vast number of cases the peculiar smell, or scent, of an animal is distinctly recognisable by the human organs of smell. I do not mean simply in such notorious instances as those of the goat, the fox, the foulmart, the pig, the sheep, the rat, the mouse, the horse, and, by no means the least, man himself, but in a great number of other instances when once our attention is attracted. The rook, the starling, the dog, the cat, each has an odour distinctly recognisable by us, while, as regards the creatures specially distinguished by the appellation of game, I should think no one ever turned out the fresh contents of a well-filled game-bag without being made aware that partridges and grouse, hares and rabbits emit effluvia which must needs appeal strongly to the delicate and highly organized sense of smell in the sporting-dog. How many insects, too, are not only perceptibly odorous to us, but strongly or even disagreeably so; the gooseberry caterpillar for instance, the larva of the goat-moth, the bed-bug, the cockroach, and so on without end.

There is also, probably, a good deal of resemblance between the scents given off by different animals. How often a very good pointer who is allowed, or indeed required by his master, to point at other game besides partridges, is misled, on the cultivated land, by a common fowl, a lark, a waterhen, or even sometimes one of the smaller Conirostres; on the moor by a golden plover or a titlark. Many dogs too will point at snipe. I once saw one of mine make such a point, and he seemed as much surprised at my shooting it as if I had shot at a lark at which he had mistakenly pointed. I never saw him point at another, nor willingly notice one when shot, though I had killed many couple at different times when he was with me. Woodcocks he would point, but evidently considered, on ascertaining what the fallen bird was, that both he and I had made a mistake, though not such a disgraceful one as in the case of the snipe.*

* It was, most evidently, a source of the keenest delight to this dog to have to hunt a wounded partridge, grouse, or pheasant: and the consummation of all was when he had caught the bird and held it in his mouth; his eye, his tail, his whole bearing displayed extreme gratification: a wounded snipe, however, he would not attempt to hunt; a woodcock he would look at and smell, and then "turn up his nose;" a waterhen, though apparently giving out a strong scent, he seemed to rank with the woodcock; a partridge that had fallen into the water, would be fetched out without a pause of hesitation; but by no means could he be induced to wet a foot for a waterhen or wild duck.

What the nature of this emanation or effluvium may be is a question of much difficulty; indeed, I doubt if it admits of more than hypothetical solution. There are at least two very distinct species of odours or scents,—distinct, I mean, as regards their elements and nature,—the one depending on, or rather, perhaps, consisting of a substance, whether vaporous or molecular; the other apparently without any such dependence. The former may be instanced in any so-called volatile* odorous substance, such as carbonate of ammonia or camphor; the latter in musk and two or three other substances of a somewhat similar nature: this sustains no diminution in weight, though continuously giving off its peculiar penetrating odour for a lengthened period; that sustains rapid diminution in weight as long as it remains subjected to the volatilising agencies. To which of these two classes, or whether exclusively to either, scent belongs, it seems impossible to say. The probability seems to be—and I shall give reasons for the opinion as I go on—that it partakes of both natures; that there is something in it corresponding to the substantiality of the one, and to the imponderability of the other.

General reference has already been made to the glandular odoriferous secretion peculiar to each several animal: and, in illustration of the point, I shall only adduce two or three particular instances; such, for example, as that of the fox, which "has a subcaudal gland that secretes an intolerably fetid substance, and whose urine also possesses the same intolerable odour" (Bell, Br. Quadr. 256); that of the polecat or foulmart, which derives the latter name from the fact that a "disgusting odour is produced by the exudation of a fetid secretion from a pouch or follicle under the tail, and which is even more intolerable than than that of the common weasel or the stoat" (*Id.* 159); that of the beaver, familiar to almost every one from childhood in connection with the old fable; that of man himself, from the "glands of whose axilla† is secreted, or eliminated from the blood, a peculiar odorous matter" (Kirke's 'Handbook of Physiology,' 348; Carpenter's 'Human Physiology,' 231).

* "The most odorous substances are volatile, and *vice versâ*, * * * though there are some volatile fluids, such as water, which are entirely inodorous" (Carp. Hum. Phys. 905).

† "In certain situations the sweat-glands are very large; and, as might be expected, we find their size and number in different districts of the skin to correspond with the amount of perspiration afforded by each. Thus they are nowhere so remarkable, or so easily examined, as in the axilla, over a space precisely defined by the growth of the hair in the adult. They here form a layer, which towards the middle is often one-eighth of an inch thick." (Todd and Bowman, Phys. Anatomy, 423).

Now I believe it may be asserted with respect to almost if not quite all the odours of this class, that they are apt to be retained for an indefinite length of time in any suitably absorbent substance, *e.g.* a piece of rough woollen material. A flannel shirt, in which a man has strongly exerted himself during a long day's work, and which has consequently absorbed a large quantity of sweat, will retain a peculiar smell due to the axillary secretion, even after it has passed through the washerwoman's hands; and still more of the odour, and more powerful will be contracted, if the washing does not happen to keep pace with the work; so that two or three such garments hanging in an apartment scent the atmosphere rather too sensibly to be agreeable, and without sensible diminution of their perfuming power. But the human "peculiar odour" is faint to human nostrils—except under such circumstances of accumulation as those just adverted to—in comparison with the odours of the same class in multitudes of the lower animals. A woollen glove or over-shoe which has been wetted with a few drops of the urine of a fox or a male cat, will not only retain the offensive smell for months or years, but will give it off most freely at the expiration of those months or years under the agency of either warmth or moisture.

Now it must be borne in mind that only with scrupulous care and attention to cleanliness carried out in repeated ablutions, can most members of the human family prevent the lodgment of this peculiar smell about their persons. In other creatures who do not and cannot wash as mankind does, nor yet change their woollen garments, it is inevitable that the effluvium in question should leave a permanent odour. It therefore appears to me that in every case in which scent is given off by an animal, it will in part be due to this source; and, in so far as it is due to this source, will it be of a nature corresponding to that of the scent arising from musk, or, in other words, possessing no substantiality, and so not depending upon either vapourous or molecular matters.

But it is very necessary to bear also in mind that in all animals, except the denizens of the waters, a great amount of aqueous fluid is almost always in course of transpiration from or through the pores of the skin, and that in this transudation the aqueous matter is always accompanied or impregnated with certain solid organic matters, to the average amount possibly, in human beings, of one part in every hundred; and there is reason to believe that at leat a hundred grains of azotised matter are excreted from the human skin daily

(Carpenter, Hum. Phys. 632). The greater proportion of this solid matter appears to be a protein-compound in a state of incipient decomposition. Urea also has been detected in it. Now both urea and protein compounds, under the influence of decomposing agencies, are active as well as important elements in the production of ammonia, a distinct salt of which substance moreover is found in the azotised matter under mention. Now, processes strictly analogous—not to say identical—with this of transudation in man are known to take place in all the warm-blooded animals,* differing only, it is probable, in the degree to which, in the different classes of animals, the process is severally carried on.

Hence then we are at liberty to infer that an ammoniacal element is one of the accessories, if not constituents, of scent in the extended acceptation of the word.

It may be as well, perhaps, while noticing these peculiarities or phenomena of transudation, to notice also in this place, rather than further on, the fact that cutaneous excretion is complementary to, or vicarious with, renal excretion. Thus, Dr. Carpenter says,—"The cutaneous excretion, as already pointed out, is in great degree vicarious with the urinary, in regard to the amount of fluid eliminated; the urine being more watery in proportion as the cutaneous exhalation is diminished in amount, and *vice versâ*. But we are also to look at these two excretions as vicarious in regard to the elimination of the products of the 'waste' of the system. The share which the skin has in this office has probably been generally under-rated. There is reason to believe that at least 100 grains of azotised matter are excreted from it daily; and any cause which checks this excretion must throw additional labour on the kidneys, and will be likely to produce disorder of their function." (Hum. Phys. 631). Now in man—and there is no doubt that a perfect analogy exists in these matters between man and the lower animals—"the quantity of urea secreted at any given period of life seems to depend mainly on two conditions—namely, the degree of muscular exertion

* "The skin, in most of the Mammalia, is an important excreting organ, being usually furnished with a multitude of glandulæ, which discharge their products upon its surface. The products of these glandulæ vary considerably in different animals, and in different parts of the same animal. The ordinary perspiratory glands draw off watery fluid from the blood, with a small quantity of excretory matter closely resembling that which is eliminated by the kidneys." (Princ. Phys. 547. See also *Id.* 777).

previously put forth, and the amount of azotised matter ingested as food. Thus Professer Lehman ascertained that, by the substitution of *violent* for *moderate* exercise, the quantity of urea was raised from $32\frac{1}{2}$ to $45\frac{1}{3}$ parts; and Simon found that, by two hours violent exercise, the proportion of the urea in the urine passed half an hour subsequently was double that contained in the morning urine." (*Id.* 619). Now, when an animal is subjected to pursuit in the chase, and compelled to make great and continued muscular exertion, transudation is extremely copious, while the determination of fluid to the bladder is very remarkably lessened; and when we bear in mind how great the "waste of the system" must be in an animal so situated, it seems much more than probable that, allowing for the greater proportion of urea in the small quantity of urine secreted, the excretory action of the cutaneous glandulæ also will be greatly intensified, and that, in consequence, greatly more of the azotised matter will pass off through their agency. This conclusion certainly harmonises very closely with the well-known fact, that an animal—a fox, for instance, or a hare—which has been closely and continuously hunted for some little space of time, gives off scent both stronger and more copious than at earlier periods of the chase, as also with this other, that "the huntsman has the greatest fear of losing his fox, not only at the beginning of the run before the hounds get well settled to the scent, but also when the game is sinking. The old hounds, towards the end of the run, make every effort to get to the head of the pack, for *they* know the end is at hand. Yet even then, perhaps, all at once all scent seems to be lost; the fox has got into a ditch, or even laid down upon the ground, and no dog can touch the scent, even though within a yard of the animal." The explanation seems easy enough,—the animal is exhausted; in other words, the waste of the system has continued so actively and so long, that it must of necessity come to an end, and with its cessation is contemporaneous the cessation of excretion and its dependent odour.

In the next place I have to remark that perfect stillness or quiescence in the scent-emitting creature, if of some duration, seems to bring the emission down to the minimum, if not actually to interrupt or neutralise it. Motion, on the other hand, though not in the least degree rapid, or sustained, or energetic, appears to cause the emanation to be given out very perceptibly. A hare or rabbit on its form is often missed altogether, or run over by the pointer: if found, the dog is usually within a very few feet or even inches of the

motionless creature. Several instances have occurred under my own observation, or have been related to me by others on whose accuracy, alike of observation and relation, I could fully depend, which are curious as illustrating this point. Thus one day last season I got over a gap in the fence into the corner of a field where the hedges forming the corner came together at a right angle; immediately on entering the corner my dog stood at a place in the fence running into that we had crossed, about ten or twelve feet from the angle; I crossed this fence also, and eventually got a shot at a single partridge which had run through from the point at which the dog had taken up the scent, and after running up the ditch about fifteen or twenty yards, had stopped and lay very close. 'Don' was not satisfied at finding only one bird; he seemed to be convinced there ought to be more. He tried back, over the hedge, and up the other side. I followed; but there were no more partridges to be found in that direction. Still the dog was not satisfied, and quartered every inch of the ground from the spot where he had first pointed. I thought he was mistaken, and turned back towards the gap over which I had entered the field. Now, however, it appeared that 'Don' was right, for a second bird rose from a tuft of grass which I had passed so close to three or four times as almost to brush it with my feet, and my dog as often, without even the slightest suspicion of scent. After reloading, he came up to me, and as he passed at once recognised the bird's hiding-place—thus showing that scent had been diffused by the bird's motion, and although he had neither seen it fly nor fall, went direct to the hedge into which it had fallen, about twenty-five yards distant, and pointed. Again, in a communication I have lately received, the writer says,—"I have seen a dog pass a rabbit on its form without scenting it; I have found the rabbit myself, and seen it crouch itself down closer; and then the dog coming round again has at once pointed it. In that case I supposed the animal by its motion diffused the scent more strongly round it." Again, "I was walking with a pack of beagles which were trying the ground all round me on a fallow field; I found a hare lying; two of the dogs were close to her, and on my giving the usual 'tantara,' one of them stopped and looked up at me, and, in doing so, set his foot upon the hare's back; but, till the hare sprang from her form, had not the slightest idea of where it was. It was rather a frosty morning, but they had previously found and run a hare very well."

Perhaps the grounds afforded in these and similar cases for inferring the presence of an ammoniacal element in scent are quite sufficiently

slight—at all events would be if the ground for such inference which we have already noticed did not exist; still we cannot help remarking the appearance of analogy between scent in such cases and the exhalations from a heap of slowly decomposing manure or heating weeds. According to the old proverb, as long as it is left undisturbed little or no smell is emitted; but only stir it, and the *olet* process is not long in beginning.

But further, when the animal moves the scent is not only given off or emitted, but remains, for a variable length of time, upon or about its track. It must, of course, remain thus, either from being suspended in the atmosphere, or from being, so to speak, affixed to the material objects closely passed by the animal as it moved on.

That it is occasionally suspended—and considering the nature of the medium of suspension, for a lengthened period—in the atmosphere, is certain; and on this fact are founded such expressions in connection with scent as "breast-high." The floating molecules—if molecules there be—of effluvium strike the olfactory membranes of the dog (or other animal concerned) at a considerable distance from the animal emitting it, and while he is ranging with his head high above the surface of the earth. I avail myself once more of the communication from which I have before quoted. "I have viewed a fox away from cover, and when the hounds have come to my halloo they have taken up the scent and gone off at full cry more than a hundred yards before they came to the actual track of the fox." The same fact is at the bottom of the extreme caution requisite on the part of the sportsman in stalking deer in Scotland, or any of the numerous game animals in other quarters of the globe, not to "give them his wind;" in other words, not to place himself even for a moment in such a position relatively to them and the direction of the wind, that his scent may be wafted in the currents of the latter within reach of their olfactory organs.* And exactly similar facts are presented to the observation of the shooter in every good scenting day during the season in connection with the usual objects of his pursuit—partridges, pheasants and grouse.

* I have sometimes purposely concealed myself when my dog was in a distant part of the field I was walking in. He might not miss me immediately, but as soon as he did he made for the point at which he last saw me. If before he reached that point he "crossed my wind" he invariably came directly to my hiding-place; if, on the other hand, the wind lay from him to me, he took up the scent of my steps and hunted me to my concealment.

But independently of such cases as these in which a dog "winds" a covey, or possibly a single bird only, from a distance of two or three hundred yards, I have seen dogs continually, and my own dog fifty times during the last season, on coming across the scent of a wounded bird, which was not the least disabled for running and had got a great start while I was loading, set off at great speed; oftentimes never checking for a moment, and never appearing to make the slightest effort after the scent; and invariably go as direct to the bird (which he had never even seen in some cases) as if he was running "at gaze" all the time; while at other times, and not rarely, he had to work every foot of the track, and it was only with pains and patience and at a slow pace that he brought his quest to a successful issue. In the former case, the scent was not only "strong," but it was a "good scenting day;" that is, the atmosphere was in the most favorable condition for holding the scent suspended: in the latter case, just the reverse.

And how much the state of the atmosphere has to do with it any one may easily observe for himself by contrasting his perception of the odour from a bean field or clover field in blossom in the middle of a fine, dry, sunny day, and in the evening of the same day not long after sunset when the atmosphere is more than comparatively moist. The same, too, of a dunghill or "middenstead" at different times: to-day you may pass it with scarcely any nasal intimation of its presence; to-morrow your olfactory nerves will give you ample testimony of the abundance of ammonia evolved.* The hygrometer, would, if appealed to, doubtless give a very distinct and intelligible "Because" to your "Why."

Besides, what certainly ought not to be, but often is overlooked, in speaking on the subject of scent, the state of the atmosphere almost certainly, I believe unquestionably, has an influence of another kind in addition to that just named, upon if not the perceptibleness yet the perception of scent; I mean that which it exercises upon the organs engaged in the detection or recognition of scent. Thus, in speaking of what may be called the mechanism of smell, we find

* I have frequently observed this very sensible increase of the "perfume" from a dung-hill on a frosty evening, though frost is generally held to destroy scent. But the following morning has usually in such cases explained the matter, by displaying a copious deposition of hoar frost. In what is called a black frost the most offensive compost heap does not greatly offend the nostril: no wonder then that there is very slight testimony, even if any, afforded by scent in very frosty weather, as to the path of any given animal.

an able anatomical writer expressing himself as follows: "The matters of odour must in all cases be dissolved (or suspended) in the mucus of the mucous membrane before they can be immediately applied to or affect the olfactory nerves. Therefore, a condition necessary for the perception of odours, is that the mucous membrane of the nasal cavity be *moist*. When the Schneiderian membrane is dry the sense of smell is lost. In the first stage of catarrh, when the secretion of mucus within the nostrils is lessened, the faculty of perceiving odours is either lost or made very imperfect." And it is not the least improbable, but rather the contrary, that that state of atmosphere which renders the material objects that are the ordinary recipients of scent less fitted than usual for receiving or retaining it, may simultaneously affect the usual power of the olfactory organs for its recognition.

I am led, however, to think there may be reason for the expression "strong scent," though less perhaps than they who use it suppose, except in such cases as those above adverted to of animals hard pressed in the chase; at least, if somewhat modified in meaning. The power or pungency of the emanation probably varies with the physical condition of the creature emitting it, and certainly with the emotional condition. "The secreting action of the skin is influenced by general conditions of the vascular and nervous systems, which are, as yet, ill-understood. It is quite certain, however, that through the influence of the latter, the secretion may be excited or suspended; this is seen on the one hand in the state of syncope, and in the effects of depressing emotions, especially fear, and its more aggravated condition, terror." (Hum. Phys. 632). And again: "The odoriferous secretion of the skin, which is much more powerful in some individuals than in others, is increased under the influence of certain mental emotions (as fear or bashfulness), and commonly also by sexual desires." (*Id.* 979).

Any tolerably observant person who exerts himself sufficiently, from time to time, to become a good deal heated, must be well aware that he is much more highly scented by nature at one period than at another; as also, that it is the same with the horse he drives and the dog he trains to be his daily companion or his ally and assistant in his business or sport.

But generally speaking, and omitting instances in which such influences as terror or sexual desire are known to be in operation it would seem to be most probable that the greater apparent variations in the strongness of scent depend not so much upon

the creature emitting it, as upon the state of the atmosphere and the conditions of what may be called its recipients—the objects or substances with which the creature in its movements comes into more or less close contact.

Every one must be aware how odours attach themselves, with differing degrees of permanency, to some objects or matters, and seem to leave others almost or entirely untainted. Thus, paper kept in a desk in which a grain or two of musk has been deposited contracts the strong scent of musk so fixedly that it seems almost ineradicable. The same may be said of any object on which the urine of a male cat has been shed; and a woollen article will retain the strong, disagreeable smell for years: a cake or a piece of bread will contract the scent of the wood of the closet in which it has been kept, or of a lemon, or tea, or pickles placed in its vicinity in any close receptacle; and instances of the same kind may be given to any extent. But the sugar kept in the same caddy with the tea contracts no scent; an egg side by side with the lemon contracts, certainly retains, no perceptible scent; the clean, polished silver spoon contracts no scent or flavour, even from musk, which will not give place on exposure for a few moments to the free air. As far as one can venture to generalise with any satisfactory degree of reasonableness, it would seem that porous substances contract scents most readily and retain them most strongly and permanently; but that mere porosity alone is not sufficient; there must be a degree of moisture present in the porous substance as well. Very dry bread or cake contracts much less of the closety scent than do the same substances when fresh and moist; hard biscuits of any sort, so long as they are quite dry,—and few things contract moisture in small quantities more speedily,—take up scarcely any such scent or flavour; sugar, which has no alternative but dryness, none at all; an egg, or ivory, or glass, none. It may be said a glass scent-bottle will retain scent for years after it has become empty; that a wine or spirit bottle long retains the scent and taste of the wine or spirit. No doubt it is so; but it would be hard to show, in the former case, that it was not a residuum of the scent substance itself left in the interior of the bottle by the evaporation of the spirit in which it was originally dissolved or suspended, and that in the latter case, a very similar allegation could not be made with truth. I certainly think it will be found that all substances which easily contract and readily retain foreign odours are more or less porous, and more or less disposed to attract and retain a sensible portion of the moisture of the atmosphere; and that

further, it is only when they are in the requisite condition, with respect to moisture, that they either attract or retain scents strongly.* By analogy, therefore, herbage† of various sorts with the earth itself would catch and retain scent from a passing animal, very forcibly, under favorable atmospheric and hygrometric conditions; very feebly under unfavorable conditions of that kind.

And further, I am not inclined to believe that much scent is given off by the foot of the animal, though a portion may be, and be retained by the impressions made by its feet.‡ As will be apparent

* It is possible colour may have something to do in the matter. It has been remarked that dark cloths retain the effluvia emitted during a *post-mortem* examination more strongly than light. (Hum. Phys. 908).

† By the courtesy of the master of a well-known and excellent pack of fox-hounds, I am enabled to corroborate the results of my own more limited observation by those of his extensive experience. He says: "I have always found scent better on lands where there is herbage of any kind than on fallow lands; a marked difference generally on wheat and on fallow; and that grass land more frequently holds a scent than arable land." In other words, the more herbage, *cæteris paribus*, the better scent. I may also add, on his authority, that however necessary a suitable degree of moisture may be to the existence of "good scent," yet saturation, such as is produced by heavy rain on the night preceding the chase is quite destructive of scent.

‡ It should be borne in mind that the impressions left by a hare on the ground occupy but a very small space and at very considerable intervals. Probably at every spring she covers not less than six feet; I mean, as she runs under ordinary alarm, and not at her topmost speed. It is, therefore, scarcely reasonable to expect an extensive deposition of scent by the foot in the case of the hare, or indeed of any four-footed animal of chase; and in respect of the bird, the smooth, somewhat scaly surface of the foot would seem little likely to leave much scent behind it. Still, it will be seen, I do not dispute that some scent is distributed by the foot, and it is plainly so in the case of man himself. Since this paper was commenced, my old pointer having accompanied my servant part of the way to my church, when the latter turned back, took up the scent left in my footsteps and hunted me to the church-door, where he sat and howled till warned to beat a retreat; and a few days after I saw him hunting the man above named along one of the hard, dry gravel-walks in my garden; the man had passed some few minutes before, and the dog had rather to "puzzle" the scent out for a few yards, and then he went off at speed with his nose close down to the ground. But then the foot of man gives out much and powerful scent, which is, as it were, concentrated by means of the shoe. Again, in addition to instances of the kind just quoted, which are literally innumerable, a dog will hunt his master who has passed along a road on horseback. But in this case, too, he refers to the ground for information, and therefore, I believe, he hunts the horse and not the man. Of course, there is no need to do more than simply state that the dog has no difficulty in distinguishing the scent of his master, or of any of the members of his master's family; and it is notorious that the farmer's dog knows his master's stock by night or by day. Many remarkable instances are on record, in which the shepherd's dog has

from statements and deductions made above, the scent probably proceeds from the entire body; and that it depends in any perceptible degree upon the breath of the animal is scarcely probable in any point of view, and is, besides, as it seems to me, negatived by the feeble or scanty, indeed inappreciable, amount of scent which seems to be given off by the perfectly quiescent animal. One reason for thinking that some scent, however small in quantity, is given off by the foot,—while the bulk, under ordinary circumstances, depends greatly on the surrounding herbage for its fixation, if I may so express it,—is that I have often seen a good dog hunt a freshly moved rabbit or hare for a few paces over the snow, evidently taking up the scent from the very recently imprinted footsteps. But no dog can hunt either feathered or four-footed game in the snow, even for ten yards, by the nose, except in so far as has just been mentioned. Probably the causes to which scent seems mainly to be due being in very feeble operation in frosty weather and when the snow lies deep on the ground, but little scent is emitted, and that little finds no absorbent surface to receive it, and may very possibly be destroyed or neutralised by the low temperature of the stratum of the atmosphere which lies in contact with the snowy surface.

I have been told, and it is stated in, I believe, Johnson's 'Shooter's Companion,' that there are some fields or parts of fields where scent invariably fails. A field near Pods Wood, at Layer Marney, in Essex, was mentioned several years since to the gentleman, of whose communications I have already availed myself more than once in this paper, by the master of hounds hunting that country, as one over which the hounds could never carry the scent; and the remark was corroborated on another occasion by a resident in the district, who was in the habit of frequently riding to the hounds when the meet permitted. He said there was no perceptible difference between that field and others, either as to soil or other characteristics. That scent may be cold, and only carried with great difficulty in particular places and on particular occasions, is nothing new or strange.

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been known to pick out the sheep of his master's flock when by any chance they had become intermingled with those of another. And it would be very difficult to prove that the power of smell did not at the least aid in this astonishing achievement. And on other grounds it is not hard to have to admit that the dog hunts the horse rather than the man; for the quadruped is, as a companion, nearly as familiar to him as the biped. Indeed, the mere sight of the saddle or bridle is often the only invitation the dog requires to take part in the projected excursion.

Scarcely a day in the shooting-season, or the record of a single chase of fox or hare, but affords abundant instances of the kind. "Difference in soil," as Daniel says, in his article on hunting, "alters the scent," and "the enclosure of poor lands in heathy countries sometimes renders the scent very difficult for hounds."* But that scent should always fail over one particular field or a part of it, is very remarkable, and, apparently, quite inexplicable. The failure alleged, it should be observed, is totally distinct from failures which often occur in almost any beat in long-continued dry weather. Thus, in one part of a turnip-field where the plant has missed, the surface-soil will be as dry as if baked, to the full depth reached by the horse-hoe; and here no scent will lie after 10 or 11 o'clock on a fine, sunny day. In another part of the same field, however, and close at hand, the scent will be good or strong; because there the turnips have brairded well, and their foliage serves to keep the surface-soil very sensibly damp, even when no rain has fallen for some considerable time past.

Another fact, which seems almost equally remarkable with that just now mentioned, is perhaps much more easily accounted for. "It is a curious fact," says Mr. St. John, "but one which I have often observed, that dogs frequently pass close to the nest of grouse, partridges, or other game, without scenting the hen-bird as she sits upon her eggs. I knew this year of a partridge's nest which was placed close to a narrow foot-path near my house; and although not only my people but all my dogs were constantly passing within a foot and a half of the bird, they never found her out, and she hatched her brood in safety." ('Highland Sports,' 25). Such instances are by no means rare: I knew of a partridge's nest last year on the bank by the side of a much-frequented lane, and another was mentioned in the communication more than once referred to already, in which were seventeen eggs, both of which nests were repeatedly passed by sporting dogs, but never detected or noticed by them. I believe the apparent scentlessness of the bird in such cases must depend on its utter quiescence; and it is not easy, anterior to expe-

* The authority quoted in a former note says: "A marked difference in scent is always apparent in passing over the various strata; and, universally the better the land and the better cultivated, the better the scent. Very poor lands never hold a *good* scent: a gravelly surface is by no means the quality for scent, whatever the subsoil: wet, undrained clay land holds a better scent when thoroughly saturated than in any other state; when perfectly dry, and, it may be, hard, no hound can hold a scent over it."

rience, to realise the perfect immobility with which a partridge will often retain her seat on her nest. Not to mention the repeated instances in which she has been known to sit until the scythe cut her in two, I will only relate an incident of the kind which occurred under my observation last year. I wanted a couple or two of rabbits, and had taken my gun to a wood which clothed the lower part of a somewhat craggy steep: after passing through the wood, I had gone above the crags and walked along the wall, which served rather to keep sheep and cattle from the precipice than as a boundary to the wood. At one point it occurred to me to look over the wall, in case a rabbit might be seen sitting within; I had stood for at least a minute looking down over the wood and the country that lay below in its beauty, when suddenly a partridge rose from under me, striking my leg with its wings as it flew: on looking down without moving my foot, I saw her nest with eleven eggs, and perceived that my shoe must have been in actual contact with the bird. It may be interesting to add—though not very relevant—that I believe she returned to her nest and brought out her young ones safely, as I often saw a covey during the season, corresponding in numbers, in the closest vicinity to the position of the nest.

Moreover, the utter stillness of the sitting bird may be, no doubt, often aided in its efficacy towards preventing detection by the additional circumstance that, from its situation, the nest, and with it its occupant, is often more or less elevated above the common level of the ground near it. I have often been struck by the fact that scent rarely seems to descend. It may and often does rise (sometimes to the height of four or five feet, and how much higher it is impossible to say; probably, under favorable circumstances, it continues to ascend, until by continued dilution with the atmospheric air it ceases to have any distinct or recognisable existence; but rise to a certain height it does), for I have seen my own pointer find and point game from the summit of a heap of stones laid against a five-feet wall, forming one side of a narrow lane; and other analogous cases might be adduced if it were necessary. But if a bird falls into a hedge or low tree, and rests some four or five feet from the ground, it is but rarely that the best-nosed dog obtains any intimation of the position of the game, although he may pass and repass precisely under it. I have, once or twice, under such circumstances, seen a pointer stop as if attracted by a slight taint of scent, and once have seen him rise up on his hind legs, as if under the impression that the game was above him; and my correspondent records a similar circum-

stance. On the other hand, on "the first" of last September I shot at a bird which I had marked after wounding it at a previous discharge: it fell about fifty or sixty yards from me into a thick hedge, at about four feet above the ground. My idea was that it had not fallen dead and would run: my dog, to whose point I had killed it, saw it fall as well as myself, and on my advancing after I had recharged, hastened directly to the spot; I had marked it to within a foot, but no scent could be obtained on either side of the fence, and though I looked into the part upon which it had fallen I could not see it. At last, on looking through the hedge from the other side, I saw a dark object suspended, which proved to be the partridge, quite dead. And again, much later in the season, I brought down two at one shot; one fell into a hedge not far distant, dead, and hung suspended by a leg; the other which fell to the shot proved to be shot in the head, but not disabled, and, on the approach of the dog, took wing again and flew in the wild, bewildered way, mentioned in my article on the partridge (Zool. 6012), though not to a great distance. After securing the latter I turned to bag the other; my dog passed close underneath it, caught, as it seemed, a slight, uncertain whiff of scent — for he paused for a moment—but being unable to make anything further of it, went on again. If he had only looked up, the bird hung plainly visible, and within reach if he had simply raised himself upon his hind legs.

I have now only to notice the period of duration in scent; and here again, I am much indebted to the kind courtesy of the sportsman above referred to: "The duration of scent," he says, "appears to depend mainly on the animals pursued; for instance, the scent of the fox may be run *hard* after a lapse of ten minutes; whereas, that of the "foumart" after fifteen or twenty hours. But it must be remembered, that the work of the foumart is during the night, and consequently would come under the head of "drag;" as of the fox, "on trail;" as of the hare, which can be owned after the above period: not so when found and pursued during the day, as, say, half-an-hour would stay proceedings altogether." This statement is a very interesting one: any one who has observed the tracks left by the hare, the rabbit, the fox, the stoat, the foulmart, in their movements during the night, must have been struck by the evidences afforded by the tracks of deliberateness of motion on the part of the animal traced. It is at once apparent, that every few yards the creature paused: in the case of the rabbit or hare, a single

pellet or two of dung and, possibly, a few drops of urine may be seen in a great number of places: the fox seems to have moved in a devious sort of way, but never at a greater pace than a fast walk or gentle trot, and much the same is true of the stoat or foulmart: the latter animals, too, as well as the hare and, the rabbit void their excrement and urine at night. Deliberate motion then, the processes of defecation often interrupted, as often renewed, the favorable hygrometric conditions of the nocturnal atmosphere, all of them circumstances, as we have seen, tending to produce and to conserve a strong scent, in accordance with the principles we have endeavoured to set forth and illustrate in the former portion of our paper, are all concomitants of the deposition of the most permanent "scents" we have any knowledge of. The principal "waste" of the system takes place, under ordinary circumstances, during the night in all animals whose habits are nocturnal. This is one important source of scent, and in the most favorable form of operation during their night-long rambles. Another is in a measure dependent on the emission of their fæces, liquid and solid; this, too, is in operation: while the effect of both, and of what may be called the permanent fætor of their skins or fur, is raised to its greatest pitch by the deliberate character of their movements, which at the same time allows the greatest possible quantity of the scent matters to be attracted, and, in a sense, fixed by all the suitable substances in the vicinity of which the animal passes.

I think I have now noticed all the facts and conclusions which have, at different times, presented themselves to my regard when thinking about the nature and peculiarities of scent. In conclusion, I shall only briefly observe, that in whatever degree the statements above made on the authority of eminent physiological writers are admitted to be well founded and in accordance with fact, in the same degree is the weakness of the Retention Theory displayed and itself shown to be untenable. The animal, whether feathered or four-footed, which under the influence of its emotions—terror being one of them—is irresistibly constrained to give out more than usual of its peculiar or natural odour, can under no circumstances be supposed capable of repressing or preventing the emanation of that odour, and least of all when acted upon by fear or apprehension, if not downright terror. And further, if our conclusions as to the compound nature of scent, so far, that is, as its origin and its elements or constituents are involved, are admitted to be reasonable and just, the utter impossibility, on physical grounds, of voluntary retention by any

animal of its natural scent is established. All substances partaking of the nature or properties of either musk or ammonia must be, if present on any part of an animal's skin or coat, and exposed to any diffusing agency, liable to betray themselves, whether the animal wishes it or not, to the first passer by possessing suitable olfactory powers. The only control it can have over them depends upon its perfect immobility, as by that course it is saved from putting the air immediately surrounding it and most impregnated with its scent into motion; and so from diffusing the odorous particles or vapours through a wider extent of the suspensory medium. With this remark I close the present paper.

J. C. Atkinson.

Danby Parsonage, Grosmont, York,
March, 1858.

White Thrushes, Blackbirds, &c. — In a former number of the 'Zoologist' I sent you a paper on the transmission of colour by white and pied pheasants, wherein I stated the great numbers here which had been bred originally from one white cock pheasant; and I now venture to trouble you with a further communication as to the vagaries of Nature at the same place, with reference to the colours of other birds and animals. First as to thrushes: — Last year two white specimens were found in the neighbouring parish by a boy, who has brought up one of them, which is now alive, sings, and is doing well; the other was taken out of a different nest, and I believe is since dead. This year, within about half-a-mile of where the former birds were taken, in some very secluded ornamental walks down a rocky dell or dingle, with a series of pools occupying the bottom of it, a blackbird's nest was found, and unfortunately taken; one at least of its young inhabitants was captured, which proved to be completely white; another, which luckily escaped, was quite grey or pied, and nearly the colour of a young cuckoo. These varieties in blackbirds are not very uncommon occurrences in different parts of the kingdom, but those of the thrushes are, I believe, very unusual. My next variety was in a young rook. When the young rooks are strong enough to leave their nests, a great onslaught upon them takes place here for a few days by the butler and groom, to keep them within a reasonable quantity; and at a neighbouring rookery, a few hundred yards distance, on another gentleman's property, some young friends told me the other day they had that morning killed between eighty and ninety young rooks; but notwithstanding this havoc some considerable number of the young rooks get away, and amongst others who came here for safety, I saw one, the whole of which, excepting the wings and head (which were black), was of a dun colour, and as nearly as possible had the appearance of a hooded or royston crow (as it is often called); but it was unquestionably a young rook, and in company with several old ones. The fourth example of an unusual colour are rabbits, which in this dry and heathy soil are so prolific that a rabbit-catcher is

obliged to be kept on purpose to keep them down, or the outcry of the farmers would be quite unbearable. This man is accustomed to catch in the course of the year many hundred couples of rabbits on this property and on the adjoining farms, and he states that he very seldom meets with any but the usual-coloured rabbits; sometimes he has met with a black one. Last year I saw an old rabbit near the house completely yellow or light straw-coloured; afterwards three young ones made their appearance; these were not killed until towards the month of June, when the old one and two of the others were destroyed, and the remaining young one disappeared from where it had been before seen, though the other rabbits of the usual colour still remained at the same spot. This year, in the month of April, at some considerable distance from where the yellow rabbits before mentioned had their burrow and used to reside, two or three very small completely yellow rabbits were seen sitting at the mouth of the same hole, in company with several of the common-coloured gray rabbits, apparently of the same size and age as the former; but no old one of that colour was anywhere to be seen, which must have been the case had there been any such about. Since the month of April these yellow rabbits have increased in numbers from three to eight or ten at the same spot; they are of different broods and sizes, and cannot be the offspring of the young yellow ones. In addition to these, four or five yellow ones have also appeared at other places quite distinct from the former, in a cover preserved for the game, where there are a great number of the common ones; one or two more have also occurred elsewhere; so that altogether there must now be from fifteen to twenty of these strange-looking rabbits amongst the others, and the latter are not the least alarmed at their difference of colour. I am at a loss how to account for so many of these yellow rabbits springing up, as it were, all at once in so many neighbouring places. Amongst them all in no instance has an old one of that colour been seen. Although rabbits will at night travel a good way for food or to consort with their friends, it is very seldom, when food is at hand and their burrows near, that they will go any considerable distance from home. The spot where the old yellow rabbit and her three young ones were first noticed is not the place where the present numbers of that colour are now to be seen, though it is no great distance from it. What is the cause of this sudden increase in the number of these yellow rabbits? Another somewhat unusual variety very common here is in the squirrel, of which there are numbers about with tails completely straw-colour, as well as many of the usual colour. Of the white and pied pheasants before alluded to I have many still about, and every year several broods of young pheasants may be seen, some consisting of the variegated specimens and others of the common colours. I may also add that a poor old mole-catcher who is employed here states that many years ago he caught a nearly white or very light dun-colour mole, for which he got a guinea.—*W. H. Slaney; Hatton Hall, June*, 1858.

Hooded Crows at Flambro' Head.—Being engaged in collecting Diatomaceæ under the cliffs at Flambro' Head, on the 6th of June, I noticed a pair of Corvus cornix (here called Norway crows) flying about the face of the cliffs, where no doubt they had a nest. This surprised me not a little, for, hitherto, I had considered the Scotch Highlands—where I have noticed them in immense numbers—to be their usual southerly summer habitat. On referring, however, to Yarrell, I find I have been labouring under a wrong impression, and that Corvus cornix has been noticed to breed even so far south as Norfolk, and that this is by no means unusual at Scarbro': still I

deem the fact of their occurrence at Flambro' worth recording. — *G. Norman; Hull, June* 19, 1858.

Occurrence of the Bee-eater at Kingsbridge, Devon.—I have just received from a friend a male specimen of the bee-eater (*Merops apiaster*), which he had shot in a newly ploughed field, apparently searching for insects, the remains of which I find its stomach to contain.—*Henry Nichols, Jun.; Kingsbridge, Devon, May* 22, 1858.

Hawfinch Building at Tonbridge.—A pair of hawfinches have built their nest this year in an orchard in the vicinity of Tonbridge; but, unfortunately, the nest has become a prey to a prying school-boy, who took the first egg and substituted in its place a small blackbird's egg. The next morning another egg was laid, but the blackbird's was gone: the birds were then again robbed of their egg, and have in consequence deserted. Their nest, however, has not been built entirely in vain, for a pair of house-sparrows, seeing it deserted, are now constructing their clumsy domicile on the top of it.—*T. W. Greene; Tonbridge.*

The Small Partridge.—In answer to the communication from the Rev. J. C. Atkinson in the June number of the 'Zoologist,' (Zool. 6095), in which he asks me to explain a discrepancy in my account of a small partridge shot on the heaths in this neighbourhood, and that of Mr. Kidd who had shot them on Hindhead and its neighbourhood, I can only repeat that I certainly have never remarked any difference in plumage between the heath birds shot by me and the stubble-fed birds; there may be a slight difference, but in the instances I have seen it is not worth mentioning. Fowley is not far from Hindhead, and it is the same line of heath from where I have shot these birds to Hindhead, the latter being the very much higher ground. My locality is Woolmer Forest, a large tract of waste land of many thousand acres, and which adjoins the Fowley estate, which is also surrounded by heath land; but I have also shot these heath birds in the neighbourhood of Ash and Aldershott, which is a continuation of the same line of wild heath country, but, except in the smallness of size and the absence of corn in their crops, which contained heather only, I confess I could never find any appreciable difference between them and the common partridge. I have before me the letter of a friend, an excellent sportsman and naturalist, who resides not many miles from Godalming, though on the opposite side from Hindhead, who, after having read the articles in the 'Zoologist,' writes to me as follows, throwing quite a different light upon the "little black heath-birds" of his country, and those of Mr. Kidd's description. He says: "I presume these are the same that I had up to about ten years ago on my heaths: they never went into enclosures; were black inside from living on hurts and heath. In one instance, they were thrown away by a cook, as being unwholesome, from finding when she drew them that they were quite black, and I used to send a brace of them, as I should of grouse, they were so high-flavoured: there was no particular difference in their plumage; they were a turn smaller in size and darker in colour, but not sufficiently of either but that they might have passed muster as ordinary partridges, if attention had not been drawn to them; the only remarkable part about them were their legs, which were always bluer than the common." I can only say, in reference to this, that I have always put my birds, when killed, indiscriminately into the bag with others, and have never remarked the difference of the colour of the flesh, if there is any in our heath-birds here; neither have I noticed the blueness of the legs, as mentioned in my friend's letter, but in his county the hurtle-berry abounds even more than it does on Hindhead, and this most probably influences the colour in the flesh of these birds.

However, the conclusion I draw is that the heath-birds found in all these different localities are the same partridge as the common, rather stunted in growth, like our forest-bred ponies, and their flesh and their plumage, in Mr. Kidd's birds, altered by their food, namely, heather and hurtle-berries, of which latter in all this county, there are vast quantities; and I once shot a hen-pheasant in the latter end of August, having mistaken her, when flying from me in the sun, for a grey hen (as we were black grouse shooting at the time), and her crop was one entire mass of these purple berries. This proves nothing, but the fondness of game-birds for that particular food. The extreme blueness of the legs, as mentioned in the letter I quote, if observable in all these localities, added to the difference in size, which is acknowledged by all, would certainly tend to prove a variety, as the colour of the legs would be less likely to be influenced by the food; and if I shoot any this year, I shall particularly remark this, to compare them with others, but at present I hold the supposed "mountain partridge" of the 'Field,' to be a myth.—*John W. G. Spicer; Fowley, near Lip-hook, Hants, June* 11, 1858.

Note on a Lapwing's Egg with Two Yolks.—I observed this morning in a dish of lapwings' eggs one nearly twice the usual size, and on opening it, I found that it contained two perfect yolks; although this is not an uncommon phenomenon in the eggs of domestic poultry, I never met with it before in the egg of a wild bird. Possibly, the circumstance of lapwing's eggs being so frequently abstracted from the nest in consequence of the demand for them at the table, may in some measure account for the occurrence of such an irregularity in an egg of this species.—*J. H. Gurney; Kensington, May* 24, 1858.

Domestic Ducks Nesting in a Church Tower.—Some days ago two ducks were seen on the weathercock of our church, which seemed strange, but the strangest part of the story is to be told. On the morning of the 1st instant the son of the clerk had an occasion to go up among the bells, where, to his surprise, he found the ducks had a nest with eggs in it, and this morning (June 3rd) I examined the nest; in it there are eight eggs. The elevation of the nest from the surface is some ninety feet. The ducks are the property of T. M. Boorn, Esq., who is anxious to preserve the eggs so that the young may be hatched where the eggs are at present.—*Sussex Express, June* 5, 1858. [*Communicated by the Rev. Arthur Hussey, Rottingdean*].

Occurrence of the Short Sun-fish at Torquay.—The short sun-fish (*Orthagoriscus mola*, Schneider) is a fish of sufficient rarity to make its capture worth noting, while its form is so *bizarre* and its size so great as to make it a sort of wonderment among sailors and fishermen, who invariably drag it about from house to house as a raree-show when they secure one, in the hope of a few pence. Thrice in this manner has the species been brought under my notice; at Ilfracombe, in the summer of 1852; at Tenby, in 1856; and to-day at Torquay. This last specimen is smaller than the former ones I had seen; as it is not more than about two feet in length, and a foot and a half in height; its colour, too, is a lighter tinge,—a silvery gray, becoming white on the belly, and scarcely deepening to an iron-gray, even on the back. I looked in vain for the curious disk-shaped parasitic leech,—Tristoma molæ; which is often found on the species, and which, I remember, was infesting in some numbers the

Ilfracombe specimen. This individual was captured in a mackerel seine, off Hope's Nose, near Torquay, about the middle of the day of the 15th of June instant.—*P. H. Gosse; Sandhurst, Torquay, June* 17, 1858.

Colias Edusa, Macroglossa Fuciformis and M. Bombyliformis at Winchester.—Having the day before yesterday (June 8th) captured a Clouded yellow, I thought that an event so unusual might be worthy of insertion in the 'Zoologist.' It was a fine female, evidently just out from the chrysalis, as the spaces between the nervures were in that limp condition which is observable in insects before they have become stiff by flight. The specimen was seen alive by at least ten persons. On the same day I had the good fortune to capture a specimen of Melitæa cinxia, one of Macroglossa Fuciformis, three of M. Bombyliformis and other good things. The two Macroglossæ seem very partial to the red campion (*Lychnis dioica*), for I took them all while hovering over the flowers of that plant. The neighbourhood of Winchester is, I have every reason to believe, rich in Lepidoptera. Of the sixty-five Rhopalocera, I have myself taken forty-six species, and know of others having been taken.—*J. S. Wesley; The Close, Winchester, June* 10, 1858.

[The two British Colias have occurred repeatedly in the neighbourhood of London during the past May and the present June: I believe them all to have hybernated.—*Ed.*]

Correction of an error.—I regret the readers of the 'Zoologist' should have been misled by my giving Thecla Pruni as a native of South Wales, it should have been T. Rubi (see Zool. 6100). I may also remark, I have no claim to the title of "Reverend."—*Robert Drane; Cardiff, June* 22, 1858.

Occurrence of Clostera curtula in the Isle of Wight.—A few days ago I was informed by a friend, who, though an F.G.S., &c., is not versed in insect lore, that a very curious object—a skin of a moth—was attached to the wall of his house. Not thinking it very probable that the sudden hot weather had induced a moth to throw off his outer garment, but expecting to find it was the skin of a caterpillar, I went to the spot and found it was a good specimen of Clostera curtula. Seeing it indicated in the 'Manual' as scarce, and observing it is not mentioned in a local list, published a few years since, I forward the capture in case it is thought worth recording, not being myself a Lepidopterist. It is now in the collection of a friend.—*G. Guyon; Ventnor, Isle of Wight, May* 31, 1858.

Bankia Bankiana.—I have met with this hitherto rare little Noctua in considerable numbers. It is extremely local, confined, so far as I have observed, to one little patch of bog on the mountain side. It flies heavily towards afternoon, but only for a few yards at once, settling on the stems of grass, after the fashion of a Crambus, and is easily captured.—*Edwin Birchall; Killarney, June* 19, 1858.—*From the 'Intelligencer.'*

The Larva of Xanthia Aurago.—The larva of this pretty Noctua is now feeding on the beech and the maple; but, as it seems, according to Guenée, to be but little known, and is inaccurately described by Treitschke in Mr. Stainton's 'Manual,' I have thought it might interest some of the readers to know what it is like, and how to find

it. The egg, which is ribbed and at first pink, but changes after a few days to a slate-colour, is laid in the autumn, on the buds and small shoots of the beech and maple. It hatches about the 20th of April, and first attacks the opening bud, in which it buries itself. The larva is naked, of a reddish brown, with a narrow white dorsal line, and two narrow white spiracular lines: head, six front legs, and spiracles black. After feeding on the opening bud, it then unites two leaves together and feeds and moults between them. As it attaches the leaves pretty firmly together, it seems of little use beating for it, but it may be found by raising the branch and holding it against the light, when it is easily observed between the leaves.—*Rev. B. H. Birks; Stonor, Henley-on-Thames, May* 22, 1858.—*Id.*

Capture of Camptogramma gemmata and fluviata at light, near London.—On the evening of the 5th of June, I took both these species at gas lamps in this neighbourhood, two specimens of the former and one of the latter. I have presented one of the gemmata to the cabinet of the Entomological Club.—*John Henry Tilly;* 3, *Bernard Street, Regent's Park, June* 15, 1858.

Elachista Trapeziella: its Food and Transformations.—Larva deep pink (in some individuals much darker than others, and this may be a sexual difference), with a yellowish line down the back and sides. Mandibles pitchy black. Corselet with a pitchy patch, divided by the dorsal line, in each half of which is a blackish spot. It feeds on Luzula, and the egg is apparently laid at the base of the leaf, as the larva enters from thence mining upwards and making a track so fine as to be almost imperceptible without the aid of a magnifying glass. After it has thus worked for a considerable distance it suddenly makes a broader mine and returns downwards parallel to the first track, when its operations may now be detected. The broad mine is of a dirty grayish colour, and seldom exceeds a sixteenth of an inch in width. Here I may add, that probably those who were not fortunate enough to detect it, searched on the fresh leaves. From what has come under my own notice it is only to be met with on those leaves which have assumed a purplish tinge. No doubt the egg is deposited on the young leaf, but before this is hatched, age, and other causes too sometimes, act upon it as above. Decidedly the most difficult larva to find in the whole Elachista group. When about to change to a pupa it quits the mine, and, retiring to a convenient place, it then makes a slight spinning, to which it attaches itself, as well as by a few threads thrown across its back. The pupa at first, and until near the perfection of the imago, retains a good deal of the colour of the larva. It is rather narrow, and with the dorsal ridge acute and pale. In all my examples the pupa was suspended head downwards. This is a fine species resembling none of the others in the position of its markings except E. cinereo-punctella; and from this it is at once separated by the deeper colour of the wings and the short silvery white streak running along the fold at the base of the wing. Mr. Stainton's description in the 'Insecta Britannica,' p. 254, is exceedingly good. After emerging from the chrysalis, and when the wings have been developed, they are suddenly raised to an angle forking about 90 degrees with the body, and with their superior surfaces turned to each other so as to be almost touching it, thus stand until they are fit for use. The larvæ are nearly all full grown by the end of April, and the perfect insect appears at the end of May or beginning of June.—*John Scott, Southfield Villas, Middlesbro'-on-Tees, June* 14, 1858.

Scolytus supposed to attack only unhealthy Trees: Cossus ligniperda does infest the Elm.—In the last number of the 'Zoologist,' I observe a paper,

from you, which I was very glad to see, in reference to the article by Captain Cox on Scolytus destructor and Cossus ligniperda. Now, as regards the latter feeding in elms, I had an instance of this lately brought before me: the Rev. J. Hillens was pupa digging this spring, and came to an elm that was greatly damaged by the boring of a whole brood of larvæ of the Cossus, eighteen in number, or rather this is the number that gentleman brought home with him, some of which he gave to me: thus it will be seen that Captain Cox is right so far as the Cossus will feed in elm timber; but, as you observe Zeuzera Æsculi might have been mistaken for it if the larvæ were not seen, and as the larvæ of the latter are so common in the parks and even in the squares of London, it is very probable to have been that species. Now, as regards the Scolytus destructor, I disagree with Captain Cox in saying the insect attacks healthy trees; for my part I do not believe it does so. In the neighbourhood of Exeter and in Devonshire generally, the elm is the most common tree we have, indeed it is the principal arborescent vegetation of the county; and you may hunt a hundred, nay a thousand, healthy trees and you will not find a single instance of the Scolytus; but if a tree is diseased so as to cause a stagnation in the sap in any part of the trunk or large limbs, but more particularly the former, it is near to this you will find the larvæ of the Scolytus in plenty feeding on the liber and cambium, as also the softer portions of the wood immediately beneath: it is on the mucilaginous sweet sap that the larvæ appear to subsist; and where disease has taken place either from a wound, or the decay of a branch so as to admit water and the weather to act directly on the young and delicate wood forming liber, the cells become ruptured and broken down; the consequence is, the portions of the inner bark become so gorged with sap, that it oozes out and becomes a weeping wound; and it is round about such wounds you find the larvæ of this insect feeding on this gorged portion of the liber, which is very sweet to the taste: like most other insects they appear to like saccharine fluids. Now, to prove that the insects prefer the stagnant sap to that of an healthy tree, I will instance a great number of elms that are cut down for timber and brought into the basin yard, near the quay and the steam saw-mills; in the bark of several that were cut down in the winter and early spring of 1856—so that they laid in the yard through last summer—and as I was hunting over the trees in this yard for Coleoptera in March and April of this year, and in ripping off the bark of the elms I discovered it was full of larvæ—they literally swarmed with Scolytus larvæ; indeed, they were so numerous that I was doubtful if it was that species. Well, I left them for some time until I thought they would have arrived at the pupa state, but when I returned to the trees again I found them all stripped of their bark by the poor people from the city, who steal it to burn. I was much vexed to think I could not follow up my observations: I hunted round the trees and found a piece of bark round a small knot, about the size of my hand; when taken off I saw several pupæ. I took this piece home and placed it in a breeding-cage, and, about a fortnight ago, five perfect Scolytus emerged from this little bit of bark; this I was much pleased to see, as it bore out my supposition. Now I can positively assert that all the trees that I examined in the first instance before the bark was removed were as full of larvæ as this small bit I took home with me, and, if they had remained untouched, would have produced thousands of the Scolytus, and these insects would have emerged just in time to deposit their eggs in the bark of the newly brought-in trees which have been cut down this last winter and spring; and here I may observe is the place to examine if the timber be sound and good, which I can assure you it is; so that it is the stagnant sap that attracts the insects, not the

trees (as may be said are in a semi-decaying state from being cut down), now why should we find these trees swarming with the Scolytus larvæ when there are hundreds of fine healthy trees in the adjoining fields? even two sides of the basin yard are studded with elms, but you cannot find them attacked by the insect: why, I say, do we not find them? why, because it is not their proper or natural food: it is only in those portions where disease has begun its work, and the insects are attracted to the diseased portions, like most other lignivorous species to hasten on decay, which appears to be their office, and that they carry out to the letter.—*Edward Parfitt; 4, Weirfield Place, St. Leonard's, Exeter.*

Scolytus supposed a secondary cause of injury: Cossus ligniperda does infest the Elm.—In your paper read at the Entomological Society upon Scolytus destructor, the inference you point out is certainly the correct one, viz., that the trees were not suffering from Scolytus so much as from Cossus. But my reason for writing to you is to inform you of the fact that the larvæ of Cossus ligniperda does infest the elm, so much so, that the greater number of valuable trees in Mount Edgecumbe Park are nearly destroyed through the perforations of this larva: at least I suppose the larvæ to be the cause, but I cannot give positive proof, not knowing whether they were diseased previously, and not having tried to cure them. Cossus larvæ do not always mine to the centre or interior of a tree, but are to be seen in the full-grown state lying in their trenches on the surface of the wood, just under the bark. The last four larvæ I took were in the situation I describe. Passing by a tree I saw a patch of the bark loose, and guessing the cause, I returned, took off the bark, and two great fat fellows were exposed to view; two more were another skin deeper. I have not met with Scolytus destructor here; I took one specimen at Exeter last year: our equivalent is Hylesinus crenatus.—*J. J. Reading;* 11, *Ham Street, Plymouth.*

[A number of letters have been received, the writers of which take the views indicated by Mr. Parfitt and myself, that Scolytus destructor attacks only the injured or dying trees, but I think Captain Cox is entitled to be heard in reply before anything further is published on the opposite side of the question. In the present state of the question I do not wish to enforce any opinion of my own.—*Ed.*]

Beetles in Ants' Nests.—The attention of English Coleopterists has of late been more than usually directed to the search for the beetles usually found in ants' nests, and the result has been that several species have been added to our native lists. This year I have devoted some time to the subject, with a view not only of obtaining specimens, but also of trying to discover what it was that induced the beetles to be dwellers in habitations they had not assisted to build, and where, judging *a priori* from the carnivorous habits of the proper inhabitants, they would be likely to lead very uncomfortable lives. My observations have been exclusively confined to the nests of the large wood-ant (*Formica rufa*), and, as far as I have been able to notice, the beetles live in perfect harmony with the ants, neither attacking them nor being molested by them. I have proved also by keeping the various species together in a bottle for several days, that these beetles do not hurt each other. I should also mention that the nests are full of Onisci of different sizes and colours, and possibly of different species, but they and the ants do not quarrel in the least. The sight of these Onisci led me to think that they were there, as in other places, on account of the presence of moisture or decay which favour their existence, that they were not tenants at the will of the ants, but lodged in their nests rather in spite of them. This hypothesis did not seem very easy of demonstration, but luckily I stumbled on that which threw

a light on the matter. I found an ants' nest which for some cause or other had been deserted since last year at least; it was a large heap, as much as a cart-load, quite intact, like the other ants' nests full of Onisci, Iuli, Scolopendræ and Acari, but without a single ant living in it. I took a portion from the top, spread it out on a sheet of white paper in the same manner as I had done from the nests that were full of ants, and soon had the pleasure of seeing some beetles moving among the *débris*. I repeated the process, and eventually found I had the following species, the relative numbers of each being about the same as in the other nests, except that Saprinus piceus was much more numerous:—Dendrophilus pygmæus, Saprinus piceus, Monotoma angusticollis, M. conicicollis, Trichopteryx sericans, T. atomaria, Cephennium thoracicus, Leptacinus Formicetorum, Thiasophila angulata, Oxypoda hæmorrhoa, O. formicetorum, Quedius brevis. There were also many beetle larvæ moving about. It was therefore not only clear that that the Onisci were in no way dependent upon the ants, but that those beetles I have mentioned, which are usually found in nests of Formica rufa, have no necessary connection with the ants, but merely take advantage of the circumstances favourable to their existence, which are incidental to the nests, such as the decaying wood and vegetable matter, the heat which is considerably greater than that of the atmosphere, and the Acari and other small creatures which abound. The xylophagous beetles, I have no doubt, feed on the wood, the carnivorous on the Acari, &c., which are fostered by the heat. It is certainly curious that certain species of ants have for lodgers only certain species of beetles; it has been surmised that the formic acid of the ants has an attraction for most of the beetles, and it may be so, but I am inclined to the opinion that investigation will show that in many cases where a direct connection with the ants is now supposed to exist, it is merely some contingent circumstance that causes the beetles to frequent the ants' nests. While we cannot disbelieve the statement of Müller and others that Claviger foveolatus secretes a fluid which is eagerly taken by Formica flava, in whose nests this beetle is found, and that the ants in return feed the beetles from their own mouths and carry them out of the way of danger, yet it is possible that there has been some error of observation, for similar statements have been made with regard to the Paussidæ found in ants' nests, and yet the facts have been deemed susceptible of very different interpretations. Herr Gueinzius, writing about the Paussidæ of Port Natal, says (Proceed. Ent. Soc. 1851, p. 106), "I saw a long train of ants busily running backwards and forwards, and I remarked among them a Pentaplatarthrus gently led by its antennæ by several ants, which accompanied it in the common procession. My first idea, that it was forcibly held against its will, I gave up, when on this and following days I several times saw the same fact occur on the approach of a thunderstorm." But Mr. Plant, also writing from Port Natal, says of the Paussidæ (Proceed. Ent. Soc. 1855, p. 121), "Respecting their habits, I think the notion that they live with the ants, or are at all desirous of their society, is an error: all that I saw were close prisoners and jealously guarded. The beetles are in the bottom of the tufts of grass, and owing to the small size and matted nature of the herbage, are very difficult to discover in that position, but it is the business of the ants to find them, and well they perform it. The ants do not kill them on the spot simply because they can convey them home alive. * * * The sum of my observations amounts to this:—the Paussi do not seek the ants nor remain with them voluntarily; on the contrary, they use every possible exertion to escape, though not one that I saw succeeded in doing so, they are captives to the ants; and for what other purpose should the latter

toil in their capture, but in the pursuit of their natural instinct to secure food wherever it is offered." I quote these remarks to show how differently the same circumstance may be estimated, and that although it is possible Müller is right about the Claviger, it by no means follows that all beetles found in ants' nests are in any way connected with the ant. It is, no doubt, very singular that such voracious creatures as the ants allow so many aliens to live among them unmolested, but though apparently ready to eat any living thing, may they not, like other animals, have their likings and dislikings? In some instances, especially where the resemblance of the beetles to the ants is very great, it will probably be found that the beetles frequent the ants' nest to eat the ants, but it is not likely that any beetles which the ants will devour are voluntarily in their company.—*J. W. Douglas; Kingswood Place, Lee, June*, 1858.

Cossonus linearis.—Remarking the supposition that this insect had not probably occurred for twenty years prior to its discovery by Mr. Janson, the place of capture being one of the arcana of science; I beg to state that I met with it in the course of last summer sunning itself on the tops of palings, near the railway-station, Upper Norwood.—*Alfred Haward; Gloucester Road, Croydon, June* 22, 1858.

Proceedings of Societies.

Entomological Society.

June 7, 1858.—J. O. Westwood, Esq., V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'First and Second Report on the Noxious, Beneficial and other Insects of the State of New York, made to the State Agricultural Society, pursuant to an appropriation for this purpose from the Legislature of the State,' by Asa Fitch, M.D.; presented by the author. 'Journal of the Proceedings of the Linnean Society,' Vol. ii., No. 8; by the Society. 'The Natural History Review', Vol. v., No. 2; by the Dublin University Zoological Association. 'A Monograph of the Asiatic Species of Neptis and Athyma, two genera of Diurnal Lepidoptera belonging to the Family Nymphalidæ,' by Frederic Moore: 'Descriptions of some New Species of Lepidopterous Insects from Northern India,' by Frederic Moore; by the Author. 'Annales de la Société Entomologique Belge,' Tome premier; by the Society. 'Bibliotheca Historico-Naturalis,' Vol. vii., No. 1; by the Author, E. A. Zuchold. 'The Zoologist' for June, 1858; by the Editor. 'List of the Specimens of Lepidopterous Insects in the collection of the British Museum,' by Francis Walker, F.L.S., &c.; Part xiv. —Noctuidæ; by the Author. 'Report of the Proceedings of the First Meeting of the East Kent Natural History Society'; by Captain Cox. 'The Journal of the Society of Arts' for May; by the Society. 'The Literary Gazette' for May; by the Editor. 'Descriptions de Six Longicornes Exotiques Nouveaux,' par M. Chevrolat (from Archiv Entom.); presented by the Author.

Exhibitions.

Mr. Stevens exhibited a number of Coleoptera found in nests of Formica fuliginosa and F. rufa, amongst which were examples of Myrmedonia cognata and M. lugens, and a fine series of Dinarda Maerkelii, taken near Guildford, of which he distributed specimens amongst the members present.

Mr. Smith exhibited a specimen of Myrmica cingulata, found by Mr. S. Stevens in a nest of Formica fusca, and examples of Myrmica lippula and Ponera contracta, found by Mr. Janson in company with Formica fuliginosa; he wished those entomologists who were in the habit of searching for Coleoptera in ants' nests would bear in mind that several rare species of Myrmicidæ are only to be met with in the nests of the different species of Formica, and that two or three such species of Myrmica well known to continental entomologists have not yet been discovered in this country.

Mr. Janson exhibited an example of a species of Trichonyx, found by Mr. E. Shepherd in a colony of Formica flava, under a flint on the "Hogsback," near Guildford, on the 21st ult. Mr. Janson observed that it was the same species which he had alluded to in his paper on Coleoptera frequenting ants' nests, in the 'Entomologist's Annual' for 1857, but he had not yet been able to identify the insect with either of the two known continental species of this genus.

Mr. Janson also exhibited specimens of an Hemipterous insect which he had taken on several occasions in nests of Formica rufa at Hampstead and Highgate, and which he was disposed to refer to the Microphysa myrmecobia, *Maerkel*, in Germ. Zeitsch. f. d. Ent. v. 262, 276 (1844), with whose description the individuals before the Meeting agreed pretty closely, differing, however, somewhat in the sculpture of the head and thorax. He remarked that he had met with the male only, the female, according to Germar, has the hemelytra truncate—a structure obtaining in M. Pselaphiformis, *Westwood*, Annales de la Soc. Ent. de France, iii. 642, tab. vi. f. 3 (1834). [Loricula Pselaphiformis, *Curtis*, Ent. Mag. i. 197 (1833); Microphysa pselaphoides, *Burmeister*, Handb. d. Entom. ii. 286 (1835)], and which may possibly prove to be the female of the present species, although here the apical joints of the antennæ are decidedly the longest, and the rostrum is broad and scarcely exceeds the head in length.

Mr. Westwood observed that so long a period had elapsed since his attention was given to the species in question, that he could not then express an opinion in this matter; the specimen which Mr. Janson had placed in his hands would enable him to institute a comparison, the result of which he would communicate at a future time.

Mr. Stainton exhibited a specimen of a new species of Cemiostoma, bred by Mr. T. Wilkinson, from Lotus, and for which the name "Lotella" had been proposed: the insect is closely allied to C. scitella, from which it differs in the narrower anterior wings, the different position of the radiating dark lines in the cilia, and in having the apical spot from which these lines appear to emanate, black, instead of tawny as in scitella.

Mr. F. Smith exhibited two hermaphrodites in the aculeate Hymenoptera, *viz.*, a specimen of Nomada baccata, and of Andrena nitida; in both insects the male characters were on the right side of the body.

Mr. Douglas exhibited pupæ of a Lepidopterous insect found under bark of sycamore, and presumed to be those of Stigmonota Regiana; also a living example

of Trinodes hirtus, and a specimen of Acrognathus mandibularis, a Coleopterous insect new to this country, taken at Darenth Wood, about three years ago.

Mr. Westwood exhibited a fine specimen of the Carpocapsa, which he had recently bred from the Mexican "jumping seeds," for which he proposed the name of

CARPOCAPSA SALTITANS.

C. *Alæ anticis griseo-albis cinereo rivulosis ; costa lineolis circiter* 16 *obliquis alternatim tenuibus, angulo apicali nigricanti plaga parva ovali albida ; margine postico prope basin macula parva quadrata nigricanti, plagaque postica magna conica cinerea, nigro lineata et marginata ; margine apicali griseo plumbeo et albo variegato serie duplici punctorum minutorum nigrorum ; alis posticis fuscis ; capite et collari brunnescentibus ; palpis extus fuscis, intus albidis.* Expans. alarum antic. lin. 9.

Hab.—Larva in seminibus plantæ Peruvianæ Calliguaja dictæ, quæ motu saltatorio mire progrediuntur.

Mr. Westwood exhibited a drawing, lately received by Mr. Spence from India, of the winged male and apterous worker of a species of Dorylus, together with the larva and pupa of the latter, which had been communicated to Herr Neitner by the Hon. Walter Elliot. The male is of the ordinary Dorylus form, that sex having only hitherto been observed, but the worker is a species of Mr. Westwood's genus Typhlopone. Herr Neitner's letter is as follows:—

"Rambodde, Ceylon, March 24, 1858.

"W. Spence, Esq., London.

"Dear Sir.—When at Madras, a few weeks ago, my friend the Hon. Walter Elliot showed me an entomological sketch, a copy of which I beg to enclose, asking me what the insect represented was. There can be no doubt that it is a Dorylus, and of great interest, as it represents two sexes, and as Mr. Elliot has observed their domestic habits. With regard to the latter, Mr. Elliot states that a couple of years ago he found a large society of these insects at Collenada, near Coringa, north of Madras, at about 17° N. L. They lived in the manner of ants, under the stone foundations of a house built on loose sand, within half-a-mile of the sea-coast: the society was very numerous. Mr. Elliot brought away a number of the insects, and had a drawing made of them by a native draughtsman: the enclosed sketch is a copy of it, also made by a native draughtsman. [The drawing represents the male insect of the natural size and in different positions, with magnified details of the antennæ, legs and genitalia; also the worker of the natural size, and magnified with details, and with the larva and pupa]. There can be no doubt that these insects are closely allied to the social ants. The difference in size of the male and the worker is very remarkable. The female remains still to be discovered: still I feel confident that the enclosed sketch and Mr. Elliot's observations will interest you as much as they have interested me, and will be generally considered as an acceptable addition to the natural-history of the genus Dorylus."

Mr. Thwaites, by whom Herr Neitner's letter was transmitted to Mr. Spence, adds that "it is very interesting to find Shuckard's conjecture that Typhlopone would prove to be of the Dorylus family verified. Shuckard's paper on the subject is in the

'Annals of Natural History' for 1840: his idea of its being a parasite, is, however, certainly disproved by this discovery of Mr. Elliot."

Mr. Westwood added that Mr. Shuckard, in his 'Monograph on the Dorylides,' referred to by Mr. Thwaites, had suggested that Typhlopone was composed of females of Labidus, and had consequently removed the former from the family of the ants, considering the Dorylides as an osculant family between the Mutillidæ and Formicidæ, whereas he (Mr. Westwood), in the Arcana Ent. i. 73, had shown Typhlopone to belong to the family of the ants, and had considered the Dorylides as a section of the Formicidæ, doubting, at the same time, the supposed sexual connexion between Typhlopone and Labidus.

Mr. Smith observed that the communication was certainly very interesting: Dr. Savage had, however, to his own satisfaction, settled the relationship of Dorylus some years ago. In the 'Proceedings of Natural Sciences of Philadelphia' for 1850, a communication from Dr. Savage states, that he found in Africa a number of specimens of Dorylus in company with a new species of Anomma, "A. rubella, *Sav.*'; the latter he considers to be the workers of Dorylus, yet, notwithstanding this opinion and the details given, Mr. Smith expressed his doubts of there being any specific connexion between these insects; they were not even found in a nest, but upon the ground, the Dorylus being mixed with a procession of Anomma. Although great disparity in the size of the sexes of some species of ants was well known, no instance of the male so greatly exceeding the worker had come under his notice, and in India Dorylus was common, whilst Anomma has not yet been found. Mr. Smith was far more inclined to adopt the opinion of Dorylus being the male of Typhlopone, but he did not consider the communication decisive upon that point; the Dorylus it appeared had been discovered in the same nest, or in company with workers of Typhlopone, but the female had not been discovered, and Dorylus might yet prove to be a parasite. Mr. Shuckard had suggested the probability of Labidus, the New World representative of Dorylus, being the male of Typhlopone; and as the latter genus, or one very closely resembling it, had been received from Brazil from Mr. Bates, the communication, should the connexion therein stated prove eventually to be correct, certainly confirmed Mr. Shuckard's views.

Mr. Stainton read the following paper:—

On the persistence of Species.

"Some strangely heretical notions were broached at the last Meeting,—at least they were such notions as must appear heretical to all who have closely studied species.

"It was suggested that those individuals of a genus which all who have most carefully investigated the subject agree in considering *species*, were not in reality *species*, but merely varieties, or rather races caused by some modification of habit. The statement that different species will, in the larva state, feed on different plants, was used in an inverted manner to imply that eggs of one species laid on four or five different plants will produce apparently as many different species.

"I do not wish in the slightest degree to overstate the new theory, but I cannot see that it differs in degree from what I have just mentioned. Species somewhat similar feeding on closely allied plants were suggested as probable variations caused by the difference of food; but if a slight difference of food causes a slight apparent

difference of species, a greater difference of food would of course produce a greater apparent difference of species, and thus each genus might be assumed to consist of only a single species, varying according to its food and other circumstances.

"Hence species *are* not; they *were* merely phantoms of the brain of the naturalist.

"The difference between the two specimens of Cemiostoma I have exhibited is not a specific difference; Scitella, driven by stress of weather far from its usual food, laid eggs on Lotus, and thus produced an apparently new species. It is of course an interesting problem whether, if this insect bred from the Lotus were to deposit eggs on an apple-leaf the result would not be some other aberrant creature, which the first captor would hold to be a new species till an elaborate investigation into its pedigree should show that it was descended from Scitella, out of Lotus, by Scitella, out of apple.

"Such theories would never have been started but for the smallness of the objects under discussion.

"I have also brought for exhibition two hitherto reputed distinct species of butterflies, of the genus Vanessa; but as they are very similar in appearance, and feed on plants of the same natural order, Urticaceæ, perhaps the Meeting will now be disposed to consider Polychloros and Urticæ as one species: it will of course be remarked that the flight of these two insects is very different, that of Polychloros being far the more powerful; but then it must be borne in mind that elm trees grow higher than nettles, and consequently a butterfly bred from an elm tree might be expected to be endowed, on that very account, with stronger organs of flight.

"I could multiply similar instances *ad nauseam;* but really I feel that I am unnecessarily taking up the time of this Meeting, and I should not have recurred to the subject but for the number of young entomologists who now attend our Meetings, on some of whom the idea of gradual developments from one species to another might have most injurious effects, were it not briefly, yet effectually, exploded."

Mr. Westwood considered it would require far greater research than had yet been made, and far more argument than the few lines Mr. Stainton had just read, to disprove the theory he had advanced at the last Meeting, although Mr. Stainton was pleased to imagine he had "effectually exploded" the idea of gradual developments, yet he (Mr. Westwood) still maintained that many of the supposed new species of Micro-Lepidoptera lately established might be merely modifications of other species dependent on diversity of food or other circumstances with which we are not acquainted. That many species of animals, including insects, underwent modifications and became, so to speak, geographical or structural sub-species was well established, as might be seen in Mr. Wollaston's work on "Species," since the publication of which a great change had taken place in the minds, especially of German naturalists, as to the specific rank of many of the supposed species of Carabideous insects, which were now sunk into local sub-species. It was not sufficient to say that larvæ which had fed on the oak, would die rather than feed on any other tree, because the experiment was tried with an individual which had already become quercivorous. Many of the best botanists had also adopted the theory of local sub-species; it was quite necessary to register these permanent or even transitory sub-species, but far more philosophical to endeavour to discover the centre, so to speak, from which they radiated.

Mr. Douglas remarked that in some of the species most closely allied, as, for instance, Cemiostoma Spartifoliella and Laburnella, it was not merely that they fed on different plants, but the habit of the larvæ was totally different, and it would be a preposterous doctrine to maintain that the difference of the habit was the cause of the modification of the species, and not rather that the habit differed because the species were different.

Mr. Dunning said he was no advocate for the notion of species gradually changing from one form to another.

Mr. Stainton observed that Mr. Westwood's remarks went fully the length of maintaining the development theory, and in further illustration of the difference of habits, showing closely allied species to be distinct, he exhibited larvæ of M. Millière's new Coleophora Lugduniella, feeding on Vicia Cracca, and larvæ of C. Vibicella, on Genista tinctoria; the former larva having an ample silken cloak thrown over its black case, and the latter being entirely without the cloak; the former larva eating the leaves through into holes, and the latter blotching the leaves in the usual Coleophoric fashion.

Mr. Vardon called the attention of the Meeting to the lamentable state of the fruit trees in Worcestershire: a few weeks ago they promised one of the finest crops ever seen, which had since been totally destroyed by multitudes of caterpillars, some of which he laid before the Meeting. His own orchards were planted with currant and gooseberry bushes under the fruit trees, and the caterpillars after defoliating the latter, had descended to the former: he would feel much indebted to the members present for any suggestions calculated to remedy or mitigate this serious evil: the crop on at least 1000 acres being totally destroyed.

Mr. Westwood observed, with reference to the statement of Mr. Vardon, as to the wholesale destruction of the apple crop (as well as of that of the currant and gooseberry trees planted under the apples), that the caterpillars which had now proved so destructive for several years were those of the winter moth Cheimatobia brumata, and that as they were now full-grown, the mischief which they had produced had arrived at its height for the present year. The destruction of such of the caterpillars which still remained in the trees by beating the branches over large sheets, and which had already been practised to a large extent, was still highly desirable; but Mr. Westwood considered that the peculiarities of the perfect insect offered much greater facilities for preserving the crop of next year. The habit of the caterpillar to descend to the ground and undergo its transformations in the earth, together with the fact that the female being wingless, would only be enabled to lay her eggs upon the tips of the present year's shoots (so as to allow the newly hatched larvæ to find an immediate supply of food) by creeping up the trunks of the trees, suggested what appeared to be a satisfactory means of combatting this pest. The German horticulturists had indeed invented a kind of boot or box for the protection of the base of the trunk of the tree, composed of four upright boards fixed close round the tree, each having a small oblique ridge at the top, the inner surface which was kept (during the months of October and November when the perfect insects appear) moistened with gas tar or other sticking matter, which caught the females as they endeavoured to ascend the trees. It would also be very advisable at the same period of the year, either to remove and burn the earth beneath the trees to the depth of several inches, in order to carry away and destroy the chrysalids, or to beat the surface hard so as to prevent

the moths making their escape to the open air. Children might also easily be trained to watch for and destroy the females when they make their appearance. They, however, rapidly ascend the trees so that much vigilance is required. It had been asked whether it would not be advisable to destroy the apple trees in order to save the gooseberry and currant trees beneath, but this appeared a proceeding very doubtful of success, as the insects certainly first attacked the apples, and the destruction of the latter would only increase their attacks on the other trees.

Mr. W. W. Saunders read "Descriptions of some new species of the genus Erycina."—*E. S.*

Zoological Society.

Tuesday, April 27, 1858.—Dr. Gray, F.R.S., V.P., in the chair.

Mr. Sclater read the second part of a "Synopsis of the American Ant-birds (Formicariidæ," containing the Formicivorinæ or Ant-wrens, the second sub-family according to his arrangement of the group. The members of this section enumerated amounted to sixty-eight in number, divided into ten genera. Among these species were four considered to be undescribed, which were characterised under the names Myrmotherula multostriata, M. cinereigularis, Uromacra nigricans, and Pyriglena maculicaulis.

The Secretary read descriptions of some new Pinnæ, and of a new Oniscia, from the collection of Mr. Cuming, by Mr. Sylvanus Hanley; and descriptions of ten new species of Bulimus from the same collection, by Dr. L. Pfeiffer.

Dr. Gray made some additional observations on the genus Furcella.

He also read a paper "On a new Genus and some new Species of Uropeltidæ in the Collection of the British Museum." The new species were characterised under the following names:—Siloboura Ellioti, S. Ceylonica, Morina Templetonii, M. unimaculata, M. melanogaster, and Maudia Jerdonii.

Dr. Gray likewise read a paper "On Carpentaria, a new form of animal, intermediate between Rhizopods and Porifera, or a sponge with a foraminated many-celled shelly case."

Dr. Gray read a note on the egg of the "mooruk" (*Casuarius Bennettii*), which was exhibited to the meeting by Mr. S. Stevens.

Tuesday, May 11, 1858.—John Gould, Esq., V.P., in the chair.

Mr. Gould exhibited to the meeting a specimen of the American species, Regulus calendulus, which was shot in a wood on Loch Lomondside, by Dr. Dewar, about five years since.

He also exhibited a specimen of the night heron, which had been shot at Coombe Abbey, the seat of the Earl of Craven.

Mr. Gould stated that he had received a letter from Dr. Bennett, of Sydney, stating that since he had written the account of the new cassowary, which Mr. Gould at a recent meeting of the Society named Casuarius Bennettii, a young bird of the

same species had been brought to Sydney; that he had successfully negociated the purchase of the original adult bird, which had been placed on board the ship 'British Merchant,' in charge of Dr. Plomley, who was returning to England; and that the ship sailed on the 2nd of March, with the bird alive and in good condition. Mr. Gould therefore trusted that this rare and valuable bird would, under the care and attention of Dr. Plomley, arrive alive in the gardens. It is intended as a present to the Society from Dr. Bennett. A drawing of the young bird was exhibited to the meeting.

The Secretary read an extract from a letter dated Eastbourne, May 3, 1858, addressed to Mr. Gould, from his son, Mr. Charles Gould; it ran as follows:—"In the course of my walk yesterday I came close to a sand pit rather suddenly: a number of rabbits were playing about, which scampered off as soon as they became aware of the dread proximity of man, leaving behind them, however, six or seven nondescript companions about their own size, sedately playful, awkward and grotesque. At the distance at which I first saw them I was quite at a loss to imagine what they were. Finding they were curious rather than shy, I approached nearer, and found them to be young fox-cubs; they allowed me to venture within about fifteen yards of them, and then retired without any indecorous haste, one by one, into their holes."

Mr. Gould made some observations on the Indian Phasianidæ imported last year, and now laying in the gardens of the Society.

Drawings of the eggs of the Impeyan pheasant, the Cheer, the purple pheasant, and two species of Kalegee, were exhibited to the meeting.

Mr. Holdsworth made some remarks on the sea-anemones, and particularly on a specimen of the rare Anthea Couchii, now exhibited for the first time in the aquarium.

Mr. Sclater laid before the meeting the third and concluding portion of his "Synopsis of American Ant-birds (Formicariidæ)," containing the third sub-family, Formicariinæ. Among the forty-six species referred to this division were two from the Upper Amazon, which were considered to be new, and named Myrmelastes plumbeus and M. nigerrimus.

With reference to the eggs of Indian Phasianidæ, Mr. Sclater remarked that, though the eggs of the Gallophasis albo-cristata and G. melanota were easily recognisable, as of distinct species, as indeed were the birds themselves, yet it was well known in India that, in the region where these two species inosculate, a transitional variety is found, passing from one to the other. This was not so surprising in a gallinaceous bird, but the same thing occurred in two instances in birds of the Passerine groups, and was very remarkable. No one would deny the specific distinctness of Coracias bengalensis of the Indian peninsula from C. affinis of Assam, or of Colaptes aurata of the eastern United States of America from C. mexicanus of California and Mexico; yet, in the country where these species respectively inosculate, intermediate varieties are found.

Mr. Sclater also read the statement of the person who reared the Magellanic geese now in the gardens, from which it appeared that they were all three hatched from eggs taken from one nest in the Falkland Islands; and all doubts as to the very dissimilar male and female being of one species were thus removed.—*D. W. M.*

Proceedings of Natural-History Collectors in Foreign Countries.

Mr. Louis Fraser's Expedition to Ecuador and Peru.

Mr. Fraser's letters, containing the account of his journey from Cuença to Gualaquiza, have miscarried. The following are extracts from subsequent letters:—

"Gualaquiza, February 13, 1858.

"I have been to Zamora for a fortnight,—you will find it marked in the map. I got a few additional things, but no novelties. The insects stung my feet to such a fearful extent that they produced twenty-four sores, and I was compelled to return here, since when I have been trying to cure them and am still confined to the house. All the whites here (four in number) are suffering more or less from these entomological sores. It has rained more or less every day since I left Guayaquil, although they call it the dry season, and I have great difficulty in keeping what I have collected. As for drying them, that is quite out of the question, and after skinning and preserving my small quadrupeds, I have been obliged to put them into spirits to save them.

"I have altogether about 200 skins, some breast-bones and a skeleton of Daptrius, skulls of tapir and white-lipped peccary, some six canisters of things in spirits, some Lepidoptera, a very few shells, two orchids and a bulb, which I will try to dry in some oven in Cuença. I hope and trust that my collection, which I left in Cuença, has not suffered.

"On the road to this place I saw beautiful specimens of the Peruvian cock-of-the-rock (*Russicola Peruviana*): it is called by the Ecuadorians 'Gallo de montana.' Why it should be called 'cock of the rock' I know not, as it frequents the forests of the mountains: its cry is like the creaking of a signboard before a country inn, moved by the wind, and is compared here to that of a young monkey.

"Crossing the river Rosario, on the 14th of December, was an awful job: the river rising very rapidly, we had to walk on two very slender limbs of trees, which sprang considerably, the balustrades consisting of ropes held by boys on either side, forming anything but a pleasant or safe mode of transit: although it is only about six feet above the water, should a person fall in there would be but a very slight chance of his escaping alive. It is a mountain torrent, and the fragile bridge is laid over between four falls, of some six feet each: it is about

fifteen yards wide. Our beasts were passed by tying a hide-rope round their necks, and the boys on the opposite side hauling them across: their attempts to swim were quite useless; the torrent rolled them over and over like a cask, and they were dragged ashore almost exhausted.

"These are the best native houses I have seen anywhere; the rooms are up a ladder; the walls are composed of bamboo sticks, set about an inch apart, to let air through; the flooring is made of the outsides of bamboo flattened: the roofs are very neat and nicely rounded at the ends, and thatched with leaves; the principal fault with these houses being their springing and shaking when any one moves about.

"The Shu-iberos paint themselves with red or black, or both, in various ways, apparently according to fancy: sometimes it is done like stencilling, patterns being made and laid on the cheeks or other parts, and the colours rubbed through the openings; the chest, back, arms and legs are sometimes also covered with paint. The women are very small in size, and by no means smart in their dress, well built or good looking. A dark cotton cloth, of native manufacture, round the loins, nearly reaching to the knee, is their only garment: they dye their hair and teeth with the same black as they paint their skins with: their hair is long, tied into tails and ornamented with beetles' wings and skins of gay-coloured birds at the end, such as tanagers, blue creepers, aracaris and portions of toucans: sticks about six or eight inches long are stuck through the lobes of their ears; lately they have introduced steel penholders for this purpose: beads and seeds are used in abundance round the neck and over the breast and shoulders, and a thick hair belt is tied round the waist. Some few have a kind of scarf attached to the back of the head and hanging down to the small of the back, made of bones, two inches and a half long, quite white and said to belong to monkeys.

"The fireflies are above an inch long and very brilliant: they are called in spanish 'Cucúllu.' There is a frog with a very hoarse voice which seems to say in his gruff tones 'Pretty fire fly fly.'

I note the following, for fear it should be forgotten, and it is as well Mr. Tomes should know it: amongst my Gualaquiza specimens will be found one bat much larger than the rest: the Indian who brought it said it attacks the mules and is called in their language 'Jihimchama.'

The Indians do not live in villages, but scattered all over the country, a mile or more apart: their houses or sheds (for there are no second

stories) are about 100 feet long, 30 feet broad, and built in every respect like the one before described, but fitted all round with sloping bamboo benches or bedsteads; at the foot of each of these is a pole, raised about two feet from the ground, upon which they rest their feet, underneath which a fire is kept going. Innumerable dogs are kept tied up, generally upon these bedsteads, but always at the women's end of the building.

"Cuença, March 21, 1858.

"Here I am once more safe and sound, having returned from Gualaquiza without accident. Having bandaged up my sore feet I started, on the 1st of March, and arrived here after dark on the 5th, well nigh tired out, but my wounds, strange to say, improved, owing, I think, to the colder climate. I now propose working towards Quito, in the first place to see our minister, Mr. Cope, and, secondly, to be in a good position to drop down on Esmeraldas as soon as the dry season commences.

"Louis Fraser."

Excursion to St. Paulo, Upper Amazons. By H. W. Bates, Esq.

On the 5th of September last I again embarked on our neat little Upper Amazon steamer, the "Tabatinga," for an excursion to St. Paulo, a village higher up than any I had yet visited, being about 260 miles distant, in a straight line from Ega, but at least 400 miles following the bends of the river. I have little to relate concerning the passage thither, for voyages on the Amazons are very monotonous in their incidents; but as the river in September is at its lowest point, and therefore large tracts of sandy shore exposed to view, there was rather more amusement on the road than on my former excursions in seasons of higher water.

Almost every step of the way we passed monstrous alligators, which, especially in the little bays along the margins of the great sand banks, were congregated in great multitudes, lazily floating, and heedless of the passing steamer. Mr. Hauxwell, the well-known bird-collector, was one of the passengers, and, in the spirit of a true sportsman, could not resist having a shot at them with his rifle. There is only one narrow space in the head of the alligator where it is vulnerable, but Mr. Hauxwell managed to hit a good many. One of these, the commandanto resolved to haul on board for the purpose of extracting a part of the animal, which is in great repute among

Brazilians as a "remedio:" for this purpose he stopped the steamer and sent a boat; the men in the boat had some difficulty in towing the beast, and it took eight or ten strong men to get it on deck. It had still some remains of life, and caused great commotion on board when it lashed its heavy tail and opened its ponderous red jaws; a blow with a hatchet on the crown easily composed him at last. The length was fifteen feet, but this dimension cannot give a correct idea of the immense bulk of the animal, as the head and trunk are much larger in proportion than they are in the smaller animals of the lizard tribes generally.

Besides alligators, we were much amused in watching the turtles; these were especially numerous in the broad still bays near the sand-banks, as it was now near the time of their congregating to deposit their ova *en masse* on those places. Numbers of them would be seen ahead; their droll-looking snouts and the convex part of their shells, visible above the surface: they would remain looking at the steamer until it had nearly passed, and then apparently at last losing confidence, dived like ducks under the water. Herons, too, were in vast numbers on some of the sand-banks, especially the large snowy white species; sometimes a flock of them would keep flying ahead a short distance before the steamer for several hours together.

We reached St. Paulo on the 10th, and on the 11th I began my labours in the vicinity; continuing them, with the intermission only of a few days caused by an attack of fever, for five months, re-embarking for Ega on the 2nd of February. The village was originally formed by the Indigenes of the nation Tucúna; and indeed is still peopled mainly by them, for there are not more than a dozen white or rather mestizo traders established here, who, instead of civilizing the Tucanas, have adopted their mode of life. The Indians themselves still exist in small numbers, in their original state, in the forest about two leagues from the village, and there are many more on the different small rivers within a distance of fifty or sixty miles from St. Paulo. They are a particularly gentle and peaceable race of people; I often met them when alone and unarmed in the forest, and was always met with smiles and sometimes presents of fruit. They are a branch, doubtless, of the same race as the Juris, Mundurucús of the Tapajos and Jurúnas of the Xingu: they tattoo their faces like those nations, but generally in a different style; not in a large black patch as the Juris, nor in a cross-barred cancellated pattern, like I have seen generally amongst the Mundurucús, but in curves and scrolls on the cheeks and at the corners of the mouth. These poor

people have adopted too completely almost the only thing the low white traders at the village have had to teach them, *i. e.*, the habit of drunkenness. Life in St. Paulo is an almost perpetual orgy. I never saw anything so disgusting in the course of my travels: if it were not for this, the village would be a very good station for a naturalist. There are means for making excursions by water beyond the Peruvian frontier, as well as up some of the neighbouring rivers. The vicinity of the village itself also offers many advantages; there are good paths leading away many miles through the forest: the surface of the country is much broken up and varied; the village itself is situated on a hill, considered a remarkable elevation in this flat country; the summit of which forms a plateau, which extends about a mile into the interior, where it descends to a beautiful valley in the midst of the most luxuriant forest. On one side of the village the plateau ends abruptly, descending a springy and boggy meadow, and thence through the forest deep down into a cool shady dell, at the bottom of which flows a brook of icy-cold water. Brooks, large and small, traverse the forest in almost every direction, and one is constantly meeting with springs and bubbling sources. Some of the rivulets flow over a sandy and pebbly bed, whose banks are clothed with the most exuberant and beautiful vegetation. Indians have built their slight palm-thatched huts on their borders, without clearing, however, any extent of the forest, so you have everywhere agreeable shade and coolness. I think I have never seen such lovely spots as some parts of the banks of these rivulets; cheered even amid the heats of midday by the songs of many strange birds. There is one bird, especially, which I have heard only once or twice at Ega — here very common; the people call it the "realejo" or the hand organ,—I find its notes exactly like those of the flageolet; but its music is not so perfect as that of our European songsters, because the strain is too short, consisting of only a few tender notes like the commencement of an air, and then stopping suddenly, or interrupted by a clicking noise like a hand-organ out of wind: I could not get a sight of this bird, although its voice seems to come from the trees close by.

I applied myself during my stay here chiefly to Entomology: I was not successful in obtaining hunters to assist me in forming a collection of the birds of the locality, and there is little or nothing to be found in other departments. I was very glad to discover, in the course of the first few days, that a great number of the most conspicuous diurnal Lepidoptera were quite different from anything I had yet seen. I found a locality just within the borders of the forest,

a roosting-place of vultures very attractive to them; here nearly all the fine Nymphalidæ of the locality and many of the handsomest Erycinidæ and Hesperidæ, were accustomed to congregate. Sometimes, on hot sunny mornings, they were in such numbers that the place seemed alive with them. Of Catagrammas, there were six species, the rarest and most beautiful of which was a grand new species I discovered at Tunantins last year, and which is described and figured by Mr. Hewitson as C. excelsior: I saw only three of them during the whole of my stay and captured them all. All the Catagrammæ are very similar in habits, delighting to hover about muddy places, but are very wary, sailing away at one's approach up to inaccessible heights on the surrounding trees, sometimes settling on the foliage, sometimes on the tree-trunks. Besides excelsior there is another large species, scarlet and black, very common, especially in the streets of the village; next to this, C. Eunomia, *Hewitson*, was most abundant; of these two I captured the females within the shades of the forest where I never saw a single male: the other three were C. cynosura, *var.* pyga and Clymena. Of Epicalia, in the locality named, I observed seven species, viz., the three well-known orange-banded species, Salacia, Capenas, *Hewitson*, Ancea, and a probably new species allied to this last, having a belt of blue across all the wings: it was much rarer than the Ancea and excessively difficult to capture. Of the grand genus Pandora I took two species. P. Prola, a species found, as I have understood, in the hot valleys on the eastern slopes of the Andes in New Granada, I was glad to find for the first time; St. Paulo appears to be its lowest limit on the Amazon downwards. Its habits struck me as partly those of Ageronia and partly of Prepona, and I have not much doubt the three genera are really related nearly to one another. Pandora Rola was quite a common insect down to the end of October, flying boldly about the streets, constantly entering the open windows of the houses, settling on the white-washed walls; but it was more easily to be captured at the roosting-place of the vultures: there also in January I captured a specimen of another larger species, somewhat resembling the P. Procilla of Hewitson. Of Ageronia there were, besides four common species, two new ones, one quite abundant, the other very rare. Preponæ, allied to our Apatura Iris at home, and like it, attracted by all kinds of ordure, were daily to be seen in the same locality. Amongst a number of the common species, I captured two species new to me, both having much sharper wings and brilliant blue ocelli to the under surface of the posterior pair. In the same place were about a

dozen or fourteen species of Eubagis, six or seven of which are new to me; one is of a pale silky blue above, another which I took, however, in the heart of the forest in a sunny opening, is velvety black, with a patch of metallic-green at the base of the fore wings. These two species will contribute to vary more the forms in this most lovely and numerous genus of Nymphalide butterflies. The Eubages I consider come somewhat near our European Fritillaries and Vanessæ, and their larvæ, when discovered, I venture to prophecy, will be multispinose. Paphia and Siderone, two allied genera, were also well represented here; of the former, six or seven species were daily in great abundance, and amongst them four species new to me, one of them almost as brilliantly coloured as the Catagrammæ. Of Siderone, I obtained one of a most handsome new species, in shape of wings like the S. Syntyche, and in colours differing chiefly from that species in wanting the blue. Another genus of Nymphalidæ, very numerous here, was Cybdelis; they were abundant both in species and in individuals in the streets, on the borders of the river and within the margins of the forest, sometimes in vast multitudes consisting of two or three species; the rarer species, however, generally found solitary and apart. I think I found all the Ega species except Celina; but there occurred four species not found so low down as Ega, two of them extend only as far down as Tunantins and Fonte Boa, the other two I found for the first time at St. Paulo, neither of them has any close affinity with the other species of the genus known to me: one of them is perhaps the handsomest species of the genus, the colour and marks of the under surface of posterior wing, somewhat approximating Callithea: the other new Cybdelis, also very handsome, was, for a few days in November, excessively abundant at the roosting-place above mentioned. I found also a very interesting new species, closely allied to Cybdelis (?) Pharsalia of Hewitson; it is however constantly and clearly distinct; it was almost abundant in December for several weeks, at least on the gleamy hot mornings I used to see three or four of them together settling on the moist sandy margins of the brook in the deep dells of the forest in sunny openings. I also captured a female which resembles the same sex in the Cybdeles generally, being brown, with white spots towards the tip of the wings. Heterochroæ, although abundant as everywhere else, yielded me no fresh species, and Pyrrhogyra only one. Timetes were more numerous in species: it is a genus which prefers the moist sandy margins of water, in this respect differing from other genera of Nymphalidæ, especially the typical forms which give the preference to

mud and ordure. Berania, at Ega so abundant, here was very rarely seen, whilst Tutelina, which I never saw but once at Ega, is here quite a common species.

In the shady ravines of the forest many species of Ithomiæ were found in greater or less abundance. After having observed last year at Fonte Boa so much that was interesting and suggestive in the geographical distribution and mutual relations of the species, I was curious to observe what further was to be learned at this new locality, I found, as I had expected, an almost total change in the species. I found here nineteen species of the genus, eight of which I had never met with before: on the other hand, eight species found abundantly at Fonte Boa, do not reach this place. I. Illinissa, Ælia and the three allied species, forming a group having nearly the same colours, would appear then to find their metropolis at Fonte Boa, and are doubtless dispersed over the tract of level humid forests between the Jutahi and Teffé, southward of the Amazon and stretching towards Bolivia. The commonest species at St. Paulo was the I. Cidonia (*Hewits.*) and another really near to it, but having a totally different appearance on account of the partially white-coloured nervures; this latter as well as the other six species of St. Paulo Ithomiæ are probably as yet undescribed. Ithomia Cidonia varies very much, but its varieties all gradually blend together, and are by no means distinct like the species allied to I. Illinissa. One species, however, of similar colours to it is quite distinct, having differently coloured shoulder-coverts and collar as well as peculiar neuration and antennæ. Flying amongst the Ithomiæ was now and then to be observed a Leptalis; I was very careful to secure every specimen, and the gathered series, now I come to examine them closely, have interested me as much as any other acquisition made during my excursion. Abstraction made of a white species and the Vocula, the rest may be considered either as six species allied to L. Lysinoë (*Hewits.*), or as the latter branching out into six rather widely differing varieties. In either case they are very interesting, because some of the kinds come to imitate, each a species of Ithomia common only in this locality. It would seem then almost correct to say, that at Ega and other stations these new Leptales are not found, because the Ithomiæ to which they correspond are also absent. L. Lysinoë imitates Ithomia Flora; but three at least of the new species imitate three of the commonest Ithomiæ of St. Paulo; on the wing their resemblance is much more striking than when in the cabinet. In fact I was quite unable to dis-

tinguish them on the wing; and always on capturing what I took for an Ithomia, and found when in the net, to be a Leptalis mimicking it, I could scarcely restrain an exclamation of surprise. One species imitates exactly I. Cidonia, another I. Onega, which is more abundant at St. Paulo than at any other place, and a third another unnamed species of Ithomia, also one of the most abundant species. The resemblance between Leptales and Ithomiæ, two groups of Diurnes much more widely separated than they appear in our classifications, is repeated in the case of a group of Bombycide moths, of which there are at least two genera imitating the Ithomiæ and the larger Heliconiæ. One of them, which I saw first at the British Museum, exactly imitates Ithomia Flora; at Ega there is one imitating in the same way Ithomia Fluonia of the same locality. At Fonte Boa appears another standing in the same relation to I. Ælia of the same place, and at St. Paulo there are others occurring simultaneously with the peculiar Ithomiæ of the district. These analogies to me appear one of the most beautiful phenomena in Nature.

I am afraid I am occupying too much space with the details of my doings in the Diurnes. In the genus Papilio I saw little that was new to me: there occured a sharp-winged species apparently the same as, or nearly allied to, a species only found near Parà; the female, however, has spotless fore wings. Crassus was a common species in all other localities, being one of the very rarest. In Pieris I found two new species. The curious P. Lorena was rather common, I took also its female, which is coloured orange and black, almost like a Heliconia. The Glaucopes and Euchromiæ were the only groups of moths at all numerous: in fact, I saw very few species of the other families; but of the above two genera there were many most beautiful species, many, perhaps twelve or fifteen, new to me; and some so common, that they flew up at almost every step from the low herbage. Their habit is to fly quietly, but low, settling on leaves, but remaining on the upper surface only for an instant, hitching over the edge to conceal themselves underneath.

The locality yielded me a good many species of Coleoptera; but generally I consider the district not to be productive in large and handsome species: I attribute this chiefly to the cold clayey nature of the soil. In the Geodephaga I was glad on the first day to observe that the Odontocheilæ, the group of Cicindelæ inhabiting the forest shades of the whole country, were different in species from those of Ega and other stations; I found at once five species new to

me, whilst the commonest Ega species were no longer to be met with. On the sandy margins of the brooks in the forest, there were three or four very pretty species of Lachnophorus, also new, and two Ægæ. Besides these, I found only one Lebia, two or three Ozænæ, two Cymindes, some Selenophori and Scarites new to me. The Ozænæ are very interesting insects on account of their supposed relation to the Paussidæ. I have now about a dozen species; the largest of all, about one inch long, I took at St. Paulo, within my own house at night, long after the windows and doors were closed. I think it very likely to be the very rare O. dentipes of Olivier. It flew towards the light, and settled on the wall. On seizing it it crepitated fully as strongly as the large yellow and black Brachini of the country (B. complanatus?). Two other species I captured flying in the evening on the edge of the high banks of the river. One large species I found at the roots of a tree amongst the earth. I generally find them beneath loose bark of felled trees. With regard to the crepitating faculty, I find it is more generally possessed by the Carabides of the division Truncatipennes than has been hitherto supposed. I have observed it repeatedly and distinctly in species of Cymindis, Agra, Calleida, Cryptobatis, Coptodera, and several other genera.

In the Dytiscidæ I obtained very few things—one Hydaticus, one Copelatus and one Hydroporus—the pools of water were chiefly tenanted by three small species of the curious genus Hydrocanthus, in company with a Laccophilus. The Hydrocanthi merit close attention on account of the peculiar structure of their metasternum, the place of which can scarcely be considered as occupied by the posterior haunches, because it forms an elevated plate of very curious structure, beneath which move the posterior legs. In Staphylini I took several handsome species new to me, one a Scytalinus more than an inch long, flying abroad in the evening. In the same way I captured the largest Pselaphide perhaps as yet known, it is a Metopias. In Lamellicornes the locality proved still poorer than Ega. This is a group which requires a long stay in a locality to meet with the larger species of: I found very few in the scanty flowers which blossomed now and then along the borders of the forest; several, though small, were new and interesting, especially a striped Isonychus and two Macraspes. Within the forest I met with a third species of a small brilliantly metallic genus allied to Chalcentis, and four specimens of a strikingly handsome genuine Rutela, of a most brilliant orange-colour, with two vittæ on prothorax and other marks black. I met

with no new Coprophagous Lamellicornes, or Cetoniadæ, and only three new Cyclocephalæ. Buprestidæ and Elaters were not numerous, a few new species occurred—one a Colobogaster, found in cleaving open a piece of fire-wood. Of Chrysobothris I saw scarcely any, although they are found numerously in almost all localities settling in the hot sun on branches of felled trees. Of Longicornes I met with a few only in very fine weather. There were two metallic species of Pyrodes new to me, two pretty little Compsosomæ, a lovely Chrysoprasis with golden coppery femora, and about a dozen of the more minute species flying abroad in warm evenings. To procure these latter as well as many other rare Coleoptera flying in the evening, the edge of the high and steep banks of the river offered great advantages; because in coming up from below they came within reach, and the strong light in the back ground enabled one to discern them. One of the most interesting captures in this family was the Anisocerus Onca (*White*), here changed by a transposition of colours into an insect of quite a different appearance from the type, which is very numerous and invariable at Ega. The black spots have blended with the brown ground-colour, leaving in it several quadrate pale spots arranged somewhat like the black ones in the typical form. All the specimens I found were the same. In the great family Cyclica, I added many new species to my collection. Some groups, such as Coptocycla, are remarkably constant in form, the species being distributed over a very large extent of country in south America; thus, although I met with many curious species new to me, I find they are known Cayenne, or Columbian species, such as C. cruciata, carniolenta, aciculata, vitreata, rubicunda, Cassida trivittata, &c., one or two only I think are new species. In Omaspides, on the contrary, I find the species change from Ega to this place: thus O. basilica is here replaced by an allied, but distinct species, itself not being met with at all. There were also two other species tolerably plentiful on climbing plants in the forest. Another group which multiplies its species in the most prolific manner over districts not far apart is Doryphora: of this I met with many species almost all new to me, but unfortunately only a few specimens of each.

The last family of Coleoptera to which I shall allude is the Erotylidæ. The broader or inflated forms of which, which comprise more than half the family, are peculiar to South America, as are the Ithomiæ and Heliconiæ, and, like the former, offering one or several peculiar species in every locality fifty or a hundred miles apart: they

are on this account both most interesting groups. In ornithology the same phenomena are offered very conspicuously in the Trochilidæ and Rhamphastidæ. It appears clear to me the inference, on this account, that such groups are of recent date, geologically speaking, and are most characteristic of the present epoch of the earth's surface. At Ega the most conspicuous species of Erotylus is E. incomparabilis *Perty?* accompanying which are four or five others. At Caiçara, twenty miles above Ega, this species exists as a marked variety; at Tabatinga its place is occupied by a distinct, but similar, form; and at St. Paulo I found it, as well as all its companion species, represented by a set of quite different species. In this group, as well as in all similar groups, the species should be studied with close reference to the localities in which they are found. Hence we see how excellent is the system adopted by the British Museum, which tickets every individual specimen (at least in the Lepidoptera) and comprises specimens of each species from different points of its area of distribution.

In concluding these rambling notes, I must not forget to record also, in illustration of the position, the locality of St. Paulo occupies in the geographical distribution of Amazonian insects; that many common species found generally from Parà upwards, also occur there. Some, such as Papilio Sesostris, Epicalia Numilius, Acontius, and many others do not vary in the least, whilst those which have become very much altered from Parà to Ega, are become still further altered from Ega to St. Paulo: this is particularly the case with Mechanitis Lycidice, and I think others of the same genus. I think a great number of species will be found affected in a similar manner; they can be best studied at the British Museum, where the specimens from the different localities are doubtless to be seen together, as also others from New Granada and the slopes of the Andes.

On the whole, I brought rather more than 5000 specimens of insects from St. Paulo; amongst which there were 686 species new to me of all orders; 79 being new species of Diurnal Lepidoptera.

HENRY WALTER BATES.

The Tzetze, or formidable African Brize Fly.

By the Editor of the 'Indian Sporting Review.'

The aged naturalist and veterinarian Bracy Clark, who for more than sixty years has made an especial study of the Œstridæ (*i. e.* the "bot-flies" or "gad-flies," as distinguished from the "brize" or "breeze-flies,"—the former of which pass their maggot state within the bodies of quadrupeds, while the latter attack them to suck their blood), has doubtless succeeded in demolishing two alleged new British species of Œstrus, in the 'Zoologist' (Zool. 5542, 5630); but we must respectfully demur altogether to his identification of the terrible African tzetze with the European Œstrus Bovis (Zool. 5720), which can only be accounted for by an African specimen of the latter having been erroneously shown to the veteran entomologist as an example of the destructive tzetze.

That the famous reindeer gad-fly (*Œdemagena Tarandi*) should have lately turned up in Britain might not only have been expected from the recent importations of reindeer into Scotland, to ornament sundry noblemen's demesnes, as remarked by Mr. Clark; but, from an observation of the distinguished entomologist, Westwood, who, in his elaborate paper on the tzetze and its kindred, published in the Zoological Society's 'Proceedings' for November 26th, 1850, remarks that "at the present time some of the reindeer in the gardens of the Society, which were imported last autumn from Lapland, are infected to a remarkable extent with the tumours of this species; there must, I think," he adds, "be from fifty to a hundred tumours on one of these animals." Introduced thus into Britain, it is not improbable that it will infest the deer in parks; for, according to Sir J. Richardson, the reindeer gad-fly attacks the Wapiti stag, but not the moose or bison: and the Wapiti is akin to the European stag or "reindeer," while the fallow deer is at least as nearly affined to the reindeer as are the true stags or Elaphine group of Cervidæ. There are, indeed, two distinct species of "bots" which infest the reindeer, one being the Œdemagena Tarandi, the maggot or larva of which inhabits beneath the skin, like that of Hypoderma Bovis, and also at least two species which infest the Lepus tribe in North America; and the other, or Cephenemyia trompe, the maggots of which are found within the frontal sinuses of the animal, as with Cephalemyia Ovis in those of sheep. This, no

doubt, will seem a strange locality, and surprise the many who are unacquainted with the fact; but Bracy Clark remarks of the sheep bot that "I have mostly found them in the horns* and frontal sinuses; though I have remarked that the membranes lining these cavities were hardly at all inflamed, while those of the maxillary sinuses were highly so. From this I am led to suspect that they inhabit the maxillary sinuses, and crawl, on the death of the animal, into these situations in the horns and frontal sinuses;" and he refers to a case recorded in the first volume of the 'Medical Communications,' in which "insects were removed from the antrum maxillare of a woman, and are evidently, as Dr. Latham has supposed, the larvæ of the Œstrus Bovis." How so, this being a subcutaneous larva, infesting the back and sides of horned cattle, and not even horses? Which alone is also an exceedingly strong argument against its being the fearful tzetze of Africa, with which Mr. Clark now alleges its identity!

The French naturalists divide the Œstridæ into "cuticoles," "cavicoles" and "gastricoles;" according as the larva inhabits beneath the skin, the facial cavities, or some part of the alimentary canal of mammiferous animals; and it is not likely that the same kind of bot would be found in two of those situations. But the same species of gadfly infests different sorts of quadrupeds in some instances, as the Œstrus nasalis of Linnæus, which, according to Macquart, is found (*i. e.* in its maggot state) in the gullet not only of the equine animals, but of the stag and goat,—thus both in ruminants and non-ruminants! Again, the Œ. Pecorum finds its way into the intestines of ruminating cattle; and at least four species inhabit different parts of the alimentary canal of the horse. Other gadflies produce bots which subsist beneath the thick hide of the camel, and even of the African rhinoceroses and elephant; and there are "brize flies" also which pierce the hides of those huge quadrupeds (according to Bruce and others), as mosquitos do the human skin; but the Carnivora, so far as known, are exempt from Œstrideous parasites. Then we have African birds (the genus Buphaga) which seem specially ordained to rid the beasts of their subcutaneous maggots, and are otherwise useful to them as sentinels to warn them of the approach of man or other foes; and it is curious that the common Cape "ox-picker" (*B. africana*) has its beak naturally tipped with crimson, looking as if it had been dipped in blood; that of Abyssinia, &c. (B. erythrorhyncha) has the beak wholly crimson.

The Œstrus nasalis before adverted to is designated Œ. veterinus by

* The interior of the cavity of the bone which supports the horn.

Clark, no doubt a better appellation, as neither does its bot inhabit the nostrils of any animal, nor is it the well-known "nose fly" of our English rustics, which is the Œ. hœmorrhoidalis. Of this latter, White of Selborne remarks that, "About the beginning of July a species of fly obtains, which proves very tormenting to horses, trying still to enter their nostrils and ears, and actually laying their eggs in the latter of these organs, or perhaps in both. When they abound, horses in woodland districts become very impatient at their work, continually tossing their heads, and rubbing their noses at each other, regardless of the driver, so that accidents often ensue. In the heat of the day men are often obliged to desist from ploughing. Saddle-horses are also very troublesome at such seasons. Country people call this insect the 'nose-fly.'" Why it should ever deposit its eggs in the *ear* of the animal seems unaccountable; but Gilbert White was a most accurate observer, as every one knows, and is therefore entitled to all attention: still nothing is more curious than the instincts of the Œstridæ in depositing their ova. As regards the common Œ. Equi, "the inside of the knee is the part on which these flies are most fond of depositing their eggs, and next to this on the side and back part of the shoulder, and less frequently on the extreme ends of the hairs of the mane. But it is a fact worthy of attention," continues Bracy Clark, "that the fly does not place them promiscuously about the body, but constantly on those parts which are most liable to be licked by the tongue; and the ova therefore are always scrupulously placed within its reach," and thus pass on to the stomach: and of Œ. hœmorrhoidalis the same observer remarks, "the part chosen by this insect for this purpose is the lips of the horse, which is very distressing to the animal, from the excessive titillation it occasions, for he immediately after rubs his mouth against the ground, his fore legs, and sometimes against a tree; or, if two are standing together, they often rub themselves against each other. At the sight of this fly the horse appears much agitated, and moves his head backwards and forwards in the air, to baulk its touch and prevent its darting on the lips; but the fly, watching for a favourable opportunity, continues to repeat the operation from time to time, till at length, finding this mode of defence insufficient, the enraged animal endeavours to avoid it by galloping away to a distant part of the field. If it still continues to follow and tease him, his last resource is in the water, where the Œstrus never is observed to follow him. At other times the Œstrus gets between the fore legs of the horse whilst he is grazing, and thus makes its attack on the lower lip: the titillation occasions the horse to stamp violently

with his fore foot against the ground, and often strike with his foot as though aiming a blow at the fly. They also sometimes hide themselves in the grass; and, as the horse stoops to graze, they dart on the mouth or lips, and are always observed to poise themselves during a few seconds in the air, while the egg is preparing on the point of the abdomen."

Why this species should cause the horse so much annoyance, and the other not any, in effecting the very same object, is one of the many mysteries in the dispensation of things. The common Dhánma snake (*Coluber mucosus*) and the Cobra Capella both prey habitually on rats, and have the same foes to contend with; and why, therefore, should the one be perfectly innocuous, and the other so frightfully venomous?

But it is time to return to Mr. Clark's mal-identification of the tzetze with the European Hypoderma Bovis. In the 'Zoologist' (Zool. 5720), the veteran naturalist remarks, that "a considerable degree of uncertainty and even misapprehension appears to prevail about the fly that Dr. Livingstone so interestingly describes as annoying the cattle in Africa, and which he designates the tzetze, its African appellation. Although introduced as a new species, I beg to observe that it is a very old one under a new name, the fly so feelingly described by Moses of old as infesting the cattle of Egypt, and by Isaiah as being very troublesome in his day; and after these the heathen writers and poets, especially of Rome, do not fail to notice it. The fly itself, the cause of this trouble, has been exceedingly scarce [in collections]. * * * Now this African tzetze, I am led to believe, is the real patronymic of the French *Estre*, made more pronounceable by introducing more vowels and fewer consonants, and then from it we get the Latin *Œstrus* and the Greek *Oistron*, and so forth, all meaning the same cattle-frighting object noticed by all: and so terrific is the fright that the cattle will run away with their plough even through the opposing hedge rather than submit to their infliction; and yet, what is most curious, they possess no weapon of infliction, but simply a telescopic sort of tube for thrusting the egg down upon the skin, which, hatching there, the tiny grub gnaws its way through the skin and forms its nidus there in a comfortable abscess, leaving its abode when fully grown, and tumbling to the earth, becomes a chrysalis and next a fly, which goes forth to perform this strange round of events; the object of which appears to be to save the poor cow and ox from the effects of idleness and repletion, which, in those sunny regions, they would be so exposed to, if not roused into activity and leeched

and blistered in this way. Such are the ways of Providence, meant in kindness no doubt. It is the 'susurrus,' or whistle they make that frightens the cattle [?], and not the infliction. And what is too remarkable to be omitted, we learn, from the very ancient poet Avienus, that these isles, abounding in forests, wild cattle and these flies, were known by the name of Œstrimerides before they obtained from the Romans the name of Britannia."

The etymology may be sound, but with this very important modification, that (as was first distinctly proved by Mr. W. S. MacLeay, in the 14th volume of the Linnæan Society's 'Transactions') the οἶστρος of the Greeks was a "brize-fly" and not a "gad-fly" (or Œstrus of modern nomenclature)! In the infancy of Entomology it was likely that the two groups should be confounded: for it having probably been ascertained that the bots infesting cattle were fly-maggots, eventually becoming flies, nothing could be more natural than to suppose that the flies which were continually seen to torment the beasts were the producers of those maggots; and thus the prevalent error which has been continued even to our times, not merely by such an observer as James Bruce, of Kinnaird, in his well known account of the zimb, but even by the venerable Bracy Clark, who has actually made a particular study of the Œstridæ during a long life.

There is more to say on the subject of etymology. The names *Tzetze* and *Œstrus* with *Tsaltysalya* and *Zimb* of Bruce, as likewise our English name *Brize* or *Breeze*, have obvious reference to the "buzz" or "hum" (words of similar origin) of the insect so denominated. But the Œstridæ of modern Entomology do not produce a sound when on the wing! Whereas many of the blood-sucking flies (*Tabanidæ*, &c.), which are the chief tormentors of our cattle, are remarkable for the loud buzzing which they produce when flying about their victims; analogous to the "hum" of our tiny foes the gnats, *alias* mosquitos.

Bracy Clark fails to discriminate the two groups, when, in his essay of 1797, he remarks, that "The singular scene attending the attack on Œstrus on the herd, has often been the subject of poetical description; but no one has more naturally and elegantly delineated it than the bard of Mantua.

> "Est lucos Silari circa, ilicibusque virentem
> Plurimus Alburnum volitans, *cui Asilo nomen*
> *Romanum est, Œstron Graii vertere vocantes.*
> *Asper, acerba sonans:* quo tota exterrita sylvis
> Diffugient armenta; furit mugitibus æther
> Concussus, sylvæque et sicci ripa Tanagri."

Again, "in investigations of the following nature," remarks MacLeay, "it is not only advantageous, but necessary to begin from some fixed and indisputable position. Now such I take to be the identity of the insects termed in French *Taon;* in Spanish *Tavano;* in Italian *Tabano;* and in Latin *Tabanus.* The Tabani are unfortunately insects too common for their name to have been ever forgotten; and knowing what the country people in France call *Taons*, we know the insects which Pliny anciently termed *Tabani.* By comparing Pliny with Aristotle, we find that he invariably translates the word μύωψ (*cæcutiens*) by the Latin name *Tabanus;* and entomologists know well that this Greek name is extremely appropriate to the modern Tabani or *Taons*, which are so remarkable for their eyes, that a common species of Chrysops has at the present day the trivial epithet cœcutiens" * * * A quotation from Aristotle proves not only that the ὄιστρος was not the modern Œstrus, but moreover that Aristotle could never have seen a modern Œstrus attack cattle; for had he seen it, he would most assuredly have termed it ὀπισθοκενρος. And yet he must have seen his οἴστρος about cattle; for he states positively not only that the οἴστρῶι pierce the hides of quadrupeds, but that they are armed with a strong tongue, and are blood-suckers. In both of these last respects, it is to be observed, that they differ totally from the modern Œstrus, but perfectly agree (as M. Latreille has well said) with the Linnæan Tabani."

Homer and Æschylus and Ælian are further laid under contribution, in proof of this position: "and in short," continues MacLeay, "whenever the μύωψ is distinguished from the οἴστρος, I take the former to be either a Chrysops, or Hæmatopota,* or some insect near to them, and the latter to be some species of the modern genus Tabanus, probably the T bovinus, or 'dun-fly,' whose power of agitating cattle I have myself had occasion to witness. This last insect certainly appears to be the Asilus and Œstrus of Virgil. That the poet's insect cannot be identical with any modern Œstrus is clear from his describing it to be in great plenty, and to be 'acerba sonans.' Now the Œstrus Bovis is everywhere very rare, and according to Mr. B. Clark, makes no noise. The Œstrus Equi is also silent in flying, as I have repeatedly myself observed. So that neither of these insects can be that which is celebrated by Virgil, whose description of the ability of the ancient οἴστρος

* "One circumstance which is mentioned by Ælian respecting the Myops, namely, that it makes a louder hum than the Œstrus, is perhaps against its identity with the modern genus Hæmatopota."

to make a particular kind of humming noise is corroborated by the scholiast before mentioned, as well as by Ælian."

That Homer's insect was not the modern Œstrus is further ingeniously argued "from what he says of the season in which it makes its appearance [I omit the citation]: for there are few cases, I believe," continues MacLeay, "of the modern Œstri appearing earlier than the middle of July: and this circumstance, by the way, leads also to the conclusion, that the English *breeze* or *brize* is not the modern Œstrus, although it is generally understood so to signify in the following punning lines of Shakespeare:—

> 'Cleopatra,
> The *breeze* upon her, like a cow in June,
> Hoists sail and flies.'

"Now Mouffett, who, both as an entomological observer and as a contemporary of Shakespeare, was likely to know the insect then named *brize*, says expressly that the *breeze*, *clegg*, *clinger*, and *taon*, are all the same insect, his description of which proves it to be no other than Hæmotopota pluvialis; for which the *clegg* remains to this day the well known and appropriate provincial name, a name totally inapplicable to the modern Œstrus.

"* * * It is not, indeed, unlikely that some of the ancients* should, like Valisinieri, have seen the perfect insects of the modern Œstrus flying about cattle, and that they should have witnessed the extraordinary agitation which they produce: but, however this may be, they appear to have always confounded such insects with the more common Tabani; for it is the modern Tabanus, or some genus extremely near to it, that they have always described as the οἶστρος."

Mr. Westwood is the latest scientific writer on the general subject now in hand, with whose lucubrations I happen to be acquainted; and he not only determines both the tzetze and zimb of Bruce to be species of the genus Glossina, of the group of "brize-flies," but has treated the entire subject in his usual masterly style; and I cannot do

* Aristotle was certainly not one of these ancients, for he never could have seen a female of the modern Œstrus, as appears from his stating that no dipterous insect has a sting behind. It seems, however, to have escaped the notice of naturalists that this great philosopher was acquainted with, and has described, the larva of one of the modern family of Œstridæ; and, it is rather singular, precisely that larva which Réaumur describes as infesting the fauces of the stag, but of which the perfect insect remains still unascertained.

better than quote him, even at some length, and at the expense of a little repetition.

"The species of insects," he remarks, "which attack the larger of our domestic quadrupeds [also wild quadrupeds, and even man himself,—mosquitos to wit, among the great number and variety of them,] may be divided into two chief classes; *first*, those which do so in order to obtain a supply of food for their own support; and *second*, those which do so with the object of depositing their eggs in such a position, that the larvæ, when hatched from them, will be certain of finding a proper supply of food derived from some part of the animal, either external or internal."

In other words, the one class is simply predatory, and the other is parasitic (being predatory only during the larva or maggot phase of existence); and it should have been surmised that the tzetze fly, which occasions the sure death of so many cattle in Africa, could not be a bot-producer, as it destroys so large a proportion of the beasts that should furnish a living nidus and support for its progeny. Consequently, again we perceive that Bracy Clark must needs be in error in identifying it with the Œstrus or Hypoderma Bovis.

In loose parlance, both groups might be termed parasitic; but on the principle that the first is so designated, all predacious animals would be parasitic on their victims, the animal kingdom upon the vegetable kingdom (with seeming exceptions only), and the latter upon the mineral kingdom. Perhaps the mildest form of parasitic habit, *proprement dit*, is that of the cuckoo or "cow bunting" depositing its egg in the nest of another bird: and about the mildest form of predatory habit is that of the creature that robs another of its food; as the whiteheaded sea eagle (*Haliaëtus leucocephalus*) of North America, or its counterpart in this country (*H. fulviventer*), making the osprey yield up its captured fish; or the skua gull (*Catarracta*) and also the "frigate-bird" or "man-of-war-bird" (*Fregata*) pursuing ordinary gulls, &c., and forcing them to eject their swallowed prey, which is caught up ere it reaches the water. Certain robbers of the hive may be placed in this category: and the next step is, I believe, peculiar to the human animal, in draining the milk of kine, &c. Next follow the multitudinous and varied host of "blood-suckers,"—including the vampyres (*Desmodus*) of South America—not the large and more or less frugivorous bats (*Phyllostoma, Vampyrus*, &c.), which have been erroneously accused of this propensity, but certain species of rather small size, which are especially organised for this particular mode of subsistence, having lancet-like front teeth, no grinders whatever, and

the shortest alimentary canal in the class of Mammalia; in obvious reference to aliment so excessively nutritious, being that, indeed, to which all food has first to be converted! The Megaderma Lyra of this country also sucks the blood of smaller bats, and either devours them afterwards (as I have witnessed of one put into a cage along with its victim), or relinquishes the bloodless carcass: and here we arrive at the predatory animal that absolutely destroys its victim; as with the Ichneumon flies, &c., which ultimately do the same, invariably, among the true parasitic series.

According to this view of the matter, however, which seems clear enough, certain vile tiny habitants of the surface, "detested baith by saint and sinner," should belong rather to the predatory class; but the fact is, there is no drawing an absolute line of distinction: the "Scotch-fiddle" mite (*Acarus Scabiei*) is sub-cuticular as distinguished from sub-cutaneous; and other Acari are found inside of the quills of the feathers of living birds; and so the gradations run, till we come to so extraordinary an internal parasite as "the worm in the horse's eye," at which many readers have doubtless gazed in the living quadruped. In other words, thus the Epizoa grade into the Entozoa, untechnically so denominated; and both fall under the ordinarily recognised acceptation of the word parasite,—quite recently, an Entozoon has been discovered in the spinal chord of a sheep! But to return to Mr. Westwood's elaborate essay.

"The insects composing the first of these two classes require for the performance of their dread functions an organization of the parts of the mouth, especially fitting them to pierce the skins and hides of the quadruped upon the blood of which they subsist; and we accordingly find that it is precisely these insects which have the mouth-organs most fully developed in the different families to which they respectively belong. The Stomoxys calcitrans, and especially the different species of Tabanus, are pre-eminent in this respect; and the formidable array of lancets in the mouth of one of the latter insects is not to be met with elsewhere among the whole of the flies composing the order Diptera, to which they belong. The effects of the attacks of these insects upon the horse are perceived by the drops of blood which flow from the orifices caused by their bites, and sometimes these wounds are so numerous that the beasts 'are all in a gore of blood.' A still smaller species, named by Linneus the Culex equinus, also infests the horse in infinite numbers, running under the mane and amongst the hair, and piercing the skin to suck the blood. This insect, though given by Linneus as a Culex, appears from his description to belong

to the genus Simulium; to which genus also belongs an insect of fearful note, which attacks the horned cattle in Servia and the Bannat, penetrating the generative organs, nose, ears &c., of these animals, and by its poisonous bite destroying them in a few hours. A species of the same genus of minute Tipulidæ is common in marshy districts in England; and I have often experienced its attacks, which have resulted in the raising of a tumour on the part of the flesh which has been attacked, attended by a considerable amount of local inflammation; and hence we may readily believe the well authenticated effects produced upon the cattle above described. There are various other insects which attack the horse and ox, such as the Hippoboscæ, various species of ticks, Anthomyiæ, &c.; and if these do not, from their smaller size, cause a discharge of blood like the large Tabanidæ, it is certain that the irritation which they produce, not only by their presence upon the skin, but also by the sharpness of their bite, must be very irritating to the quadrupeds which they infest.

"The insects which do not themselves feed upon our cattle, but simply infest them for the purpose of depositing their eggs in some convenient place or other on their bodies, are in no instance that I recollect provided with an increased development of the mouth-organs; on the contrary the Œstridæ are either entirely destitute of a mouth, or have only very small rudiments of some of the ordinary parts of the mouth, so as to be entirely unfitted for biting and wounding cattle. The effects, however, which some of the species produce are as annoying as those caused by the bites of the Tabani. The female fly of the common horse-bot (*Œstrus Equi*), it is true, instils no dread into the horse around which she is intently engaged in flying, depositing her eggs here and there in particular spots where the horse is certain to lick the hairs, by which means the eggs are introduced into the mouth and passed into the stomach. So little indeed is the horse affected by the presence of this insect, that I have often stood close to one round which the Œstrus equi has been flying, until the latter has come within the reach of my hand, when I have caught it without trouble. Another species, Œ. hœmorrhoidalis, however, is much more troublesome. * * * The same kind of effect is also produced in reindeer by the Œstrus Tarandi,* and in oxen by

* Linneus notes, in his 'Journal of a Tour in Lapland,' July 19th, "I remarked with astonishment how greatly the reindeer are incommoded in hot weather, insomuch that they cannot stand still a minute, no not a moment, without changing their posture, starting, puffing and blowing continually, and all on account of a little

another species, Œ. Bovis, respecting which, however, much difference of opinion has arisen. At certain seasons, the whole terrified herd, with their tails in the air, or turned upon their backs, or stiffly stretched out in the direction of the spine, gallop about the pastures, finding no rest till they also get into the water. This Œstrus is asserted by some writers to make a strong humming noise, and hence it has been supposed that the herd of cattle are alarmed at the noise; but this must surely be an incorrect conjecture, as the Œstri, if they make any hum at all, are far outstripped in this respect by many other insects which instil no dread into oxen. Neither are they alarmed in consequence of being subjected to the same kind of attack upon so sensitive a part as the lips, as is the case with the horses attacked by the Œstrus hœmorrhoidalis. It is, however, asserted by some writers that the dread is produced by the pain inflicted by the Œstrus in depositing her eggs, her ovipositor being represented as constructed like an auger or gimlet, only having several longer points it can wound with more effect. When it is stated, however, that the Œstrus Bovis does not occupy more than a few seconds in depositing each egg, we may fairly doubt whether, with her long, fleshy tubular ovipositor, she has been able to pierce the hide of an ox; or whether, as Mr. Bracy Clark suggests, she only makes use of this long instrument to thrust the egg down to the surface of the skin, which she does not pierce, but only glues its eggs to it; the young larvæ when hatched burrowing into the flesh. If this be the case, the act of oviposition must be unattended with pain, as in the case of the deposition of the eggs of the Œstrus Equi; and we must search for the cause of the alarm of the herd, either in an instinctive knowledge that a certain insect flying round them is the parent of a grub which at a future time will be a torment to them, or in the attacks of some other insect; and I confess that I am inclined to consider that Virgil's beautiful description of the annoyance caused by

> 'Myriads of insects flnttering in the gloom,
> (*Œstrus* in Greece, *Asilus* named at Rome),
> Fierce and of cruel hum'——

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fly. Even though amongst a herd of perhaps five hundred rein deer there were not above ten of these flies, every one of the herd trembled and kept pushing its neighbour about. The fly meanwhile was trying every means to get at them; but it no sooner touched any part of their bodies than they made an immediate effort to shake it off. In one respect this season is peculiarly propitious to the insect, as the reindeer's coat is now very thin, most of the hair of last year's growth being fallen off."

has a Tabanus rather than an Œstrus for its origin." (That, surely, was abundantly demonstrated by MacLeay).

"The larva of Œstrus Bovis resides beneath the skin of the back of the ox, causing large tumours, and having the extremity of its body constantly placed at the orifice of the wound, where it was introduced as an egg, or introduced itself as a grub, the openings of its respiratory apparatus being placed at that part of the body.

"These introductory remarks," continues Mr. Westwood, "on the different modes in which insects attack our horses and oxen, and the different effects which they produce, will enable us the better to estimate the effects produced by an insect, or several species of insects, of tropical Africa, upon the horses of travellers who have lately returned from that part of the world, where their enterprising researches have been rewarded by the discovery of the great central lake Tchad [by the northern, and of lake Ngami and its tributaries by the southern route]. Captain Frank Vardon, a gentleman who has travelled far in the interior of Africa, has placed in my hands some fragments of Dipterous insects which attacked his horses, causing the death of one of them. The following is an extract from his note to me in reply to my enquiry as to the mode of its attack:—

"'I had always heard that the fly of South Africa was a large gadfly, the size of a bee or hornet. This is quite erroneous: it is not very much larger than the common house fly, but a longer and more rakish-looking insect, and easily distinguished by the transverse black bars on its body.

"'I fancy it is not met with southward of the tropic of Capricorn. It is usually found on hills, plains being free from it. I have ridden up a hill and found the tzetze increasing at every step, till at last forty or fifty would be on my horse at once. The specimens you saw cost me one of the best in my stud. He was stung by some ten or a dozen of them, and died in twenty days. I myself have been bitten by the tzetze; you would almost fancy it was a flea biting you. Some parts of South Africa are, I should say, rendered inaccessible by the presence of this pest; I mean of course to a man who travels in the usual way, with his oxen and horses.

"'How far the tzetze extends in the interior is of course as yet unknown, but I have certain information as to its being 200 miles north of the "Great Lake" [Ngami] recently discovered by my friends, Messrs. Livingstone, Oswell, and Murray.'"

This formidable insect is minutely described by Mr. Westwood under the name Glossina morsitans; and of a remarkable structural

peculiarity of the genus, he adds, that—" moreover the bulbous dilated base of the proboscis must evidently play an important part in the economy of the insect, either by giving additional support to the proboscis when in the act of piercing the skin, or by containing powerful muscles for the action of the enclosed setæ ; or, as suggested to me by Professor Owen, this dilated base may be analogous to the dilated base of the sting of the scorpion, and like it contain a reservoir of some powerfully poisonous liquid." The last conjecture suggests, most probably, the true solution of the mystery. As gnats or mosquitos are believed to instil a " droplet " of fluid which occasions the irritation from their punctures, and the purport of which may be to effect some alteration in the blood, adapting it to the minute suctorial organ of the insect, so, in like manner, the bite of the tzetze is probably envenomed, on which principle only it would seem that the effects produced can be sufficiently accounted for. Mr. Westwood remarks—" The account of the irritating powers of the Glossina given by Captain Vardon is, it is true, not so detailed as could have been desired, but we learn sufficient to arrive at the conclusion that its effects are, to a certain extent, exactly like those of the Tabanidæ; how far the attacks may be attended with tumours, similar to those produced by the Simulium, and whether a tropical climate may not extend the effects of the attack, producing inflammatory action upon animals perhaps never before in those latitudes, are questions which have yet to be answered. One thing, however, appears to me evident, that the tzetze is no other than the zimb of Bruce (an insect respecting whose real family and even existence so many doubts have been expressed), or at least that that insect is a larger species of Glossina, to whose real habits Bruce has added those of a species of Œstrus."—His figure of it was undoubtedly got up from memory ; as his figure of the Abyssinian rhinoceros is a copy of Buffon's figure of the Indian species, with a second horn added! And Mr. Westwood remarks that—" It is evident from the note added by the editor of the 8vo. edition, that the drawing of the insect was not a *bonâ fide* one made on the spot, but was manufactured at home."

Finally, I shall only further cite from Mr. Westwood's paper that—" The accounts given by Mr. R. Gordon Cumming of the destructive powers of the tzetze fully confirm the opinion here advanced, and prove that although 'its *bite* is certain death to oxen and horses,' it causes no dorsal tumours like an Œstrus [modernly so denominated]. 'This hunter's scourge,' he says, ' is similar to a fly in Scotland called

kleg,* but a little smaller; they are very quick and active, and storm a horse like a swarm of bees, alighting on him in hundreds and drinking his blood. The animal thus bitten pines away and dies, at periods varying from a week to three months, according to the extent to which he has been bitten. * * * The next day one of my steeds died of the tzetze. The head and body of the poor animal swelled up in a most distressing manner before he died; his eyes were so swollen that he could not see, and in darkness he neighed for his comrades who stood feeding beside him.' "

The best notice which I have seen of the ravages of the tzetze-fly, I proceed to cite from Mr. Anderson's interesting work entitled 'Lake Ngami' where a figure is given of the insect, magnified to about double its natural size.

"During my hunting excursions along the Teoge," observes this traveller, "I encountered, for the first time, that most extraordinary of insects the tzetze. Among the several scourges to which the traveller is subjected in the South African wilderness, one of the greatest is this insect; not, it is true, as to the wayfarer's own person, for he himself escapes almost unscathed, but as regards the horses and cattle.

"The tzetze is found chiefly in the bush, or amongst the reeds, but rarely in the open country. It is confined to particular spots, and is never known to shift its haunts. Thus, cattle may be seen grazing securely on one side of a river, whilst the opposite bank swarms with the insect. Should the natives, who are well acquainted with localities frequented by the fly, have occasion to exchange their cattle-posts, and are obliged to pass through tracts of country where it exists, they choose, I am told, a moonlight winter's night; as during the hours of rest in the cold season, it does not bite.

"In size the tzetze is somewhat less than the common blue-fly that settles on meat, but its wings are longer. Yet, though so small and insignificant in appearance, its bite carries with it a poison equal to that of the most deadly reptile. Many is the traveller who, from his draught-oxen having been destroyed by this pestiferous insect, has not only had the object of his journey completely marred, but his personal safety endangered by the loss of his means of conveyance.

"Very lately, indeed, a party of Griquas, about twenty in number, who were out elephant hunting to the north-west of the Ngami, and

* More properly "clegg"; a name for the Hæmatopota pluvialis. [The clegg is probably a very different insect, Chrysops cæcutiens—Ed. Zool.]

who were provided with three waggons and a large number of trek, or draught oxen, lost, prior to their return to the lake, all their cattle by the bite of the tzetze. Some horses brought with them to further their sport shared a similar fate.

"The very same year that this disaster happened to the Griquas, a party of Englishmen, amongst whom was my friend Frederic Green, attempted to reach Libébé; but they had only proceeded seven or eight days journey to the north of the Ngami, when both horses and cattle were bitten by the fly in question, and the party were in consequence compelled to make a hasty retreat. One of the number, I was told, was thus deprived of as many as thirty-six horses, excellent hunters, and all sustained heavy losses in cattle.

"There are large tribes which cannot keep either cattle or horses because the tzetze abounds in their country. But it is only fatal to domestic animals, as wild animals feed undisturbed in parts infested by the insect. Yet many of them, such as oxen and buffaloes, horses and zebras, dogs and jackals, &c., possess somewhat of the same nature.* Moreover it bites man and no danger follows. The sensation experienced has not inaptly been likened to the sting of a flea. When allowed to settle on the hand of man, all it is observed to do is to insert its proboscis a little further than seems necessary to draw blood. It then partially withdraws the dart, which assumes a crimson hue. The mandibles now appear to be agitated; the shrunken body swells; and, in a few seconds, the insect becomes quite full, and quietly abandons its prey. The problem to be solved is, what quality exists in domestication which renders domestic animals obnoxious to this poison. Is man not as much a domestic animal as a dog? Is it the tzetze at all which kills the animal?

"Captain Vardon, of the Indian Army, one of the earlier pioneers of the more interior parts of Southern Africa, was amongst the first to decide the point; for he rode his horse up a hill infested by tzetze, and in twenty days his doubts were removed by the death of his steed.

"According to the statement of the celebrated explorers, Messrs. Oswell and Livingstone, who were severe sufferers by the tzetze, the following symptons are observed in the ox when bitten:—the eye runs, the glands under the throat swell, the coat loses its gloss, there is a peculiar flaccidity of the muscles generally, and emaciation com-

* According to Dr. Livingstone, the tzetze "appears not to attack asses."—'Proceedings of the Entomological Society' for May 4th, 1857.

mences, which proceeds unchecked until—perhaps months after the bite—purging supervenes, and the animal perishes of exhaustion. Some die soon after the bite is inflicted, especially if they are in good condition, or should rain fall; but, in general, the process of emaciation goes on for many weeks. In some cases, the animals become blind before they die, as in that of the horse mentioned by Gordon Cumming.

"'From what I have seen of the tzetze,' writes Mr. Oswell to me, 'I believe that three or four flies are sufficient to kill a full-grown ox. We examined about twenty of ours that were bitten and died, and the appearances were similar in all. On raising the skin, we perceived a glairy appearance of the muscles and flesh, which were much wasted. The stomach and intestines were healthy; heart, lungs, and liver, sometimes all, but invariably one or the other, much diseased. The heart in particular attracted our attention. It was no longer a firm and muscular organ, but collapsed readily on compression, and had the appearance of flesh that had been steeped in water. The blood of the whole carcass was greatly diminished in quantity. Not more than twenty pints (a small pailful) were obtained from the largest ox, and this thick and albuminous; the hands, when plunged into it, came out free of stain. The poison would seem to grow in the blood, and, through the blood to affect the vital organs.

"'A curious feature in the case is, that dogs, reared on milk, die if bitten; while calves, and other young sucking animals, are safe as long as they suck. But a dog, reared on the meat of game, may be hunted in tzetze districts in safety! Man, and all the wild animals, escape with impunity. Can the poison be alkaline, and neutralised by the acid?'"—In what way? The venom of cobras, wasps, &c. reddens litmus-paper.

Proceedings of Societies.

Entomological Society.

July 5, 1858.—Dr. Gray, President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to to the donors:—'Proceedings of the Royal Society,' Vol. ix., No. 31; presented by

the Society. 'The Zoologist' for July; by the Editor. 'Exotic Butterflies,' Part 27; by W. W. Saunders, Esq. 'Bulletins de l'Academie Royale des Sciences, des Lettres et des Beaux Arts de Belgique,' 2me Série, Tomes i., ii. et iii; 'Mémoires Couronnés,' Tome vii.; by the Academy. 'The Classed Catalogue of the Educational Division of the South Kensington Museum'; by the Committee. 'The Literary Gazette' for June; by the Editor. 'The Athenæum' for June; by the Editor. 'The Journal of the Society of Arts'; by the Society. 'A Manual of British Butterflies and Moths,' No. 18; 'The Entomologist's Weekly Intelligencer,' Nos. 89, 90, 91 and 92; by H. T. Stainton, Esq.

Exhibitions.

Mr. Smith exhibited some insects of various orders collected at Sierra Leone by Mr. Foxcroft, upon which Mr. Adam White communicated the following notes:—

Anthocharis Evippe, male and female.

Philognoma Varanes. Found in West Africa as well as South Africa.

Romaleosoma Ceres. A genus of many species, of sombre and yet not unhandsome butterflies, peculiar to West Africa.

The large black Hesperia (*Mars. ?*) and two or three other interesting species may be specified.

Pontia Narica. Connecting Pontia with Leucophasia.

Myrina Alcides or an allied species. It would be very valuable to ascertain the transformations of this fine butterfly and of the allied genus Iolaus.

Acræa Circeis, Westw. There are several species of Acræa in this little collection; Acræa Euryta, *var.*, with its spined chrysalis, and Acræa Quirina, a lovely species.

The sugar-cane Nonagria, very like the one figured by Landsdown Guilding, from the West Indies.

Of Sphingidæ, Daphnis Nerii, so widely distributed, and Acherontia Atropos, whose food-plants are also widely spread, may be specified.

The fig-tree feeder is one of the most interesting moths in the collection; it belongs to the same group as Cossus and Zeuzera, and may prove a genus allied to Langsdorfia from Brazil and Cossodes from King George's Sound.

Massaga Hesparia, Walker, Cat. Lep. Het. in Brit. Mus., pt. 2, p. 358. (*Phalæna Hesparia*, Cram. Pap. Exot. i. p. 87, pl. 56, f. C).

We have an imperfect specimen of this in the British Museum from Sierra Leone, where it was found by the Rev. D. F. Morgan. Cramer published it as from Demerara, but Morgan's, and again Foxcroft's capture of it as well as its affinities, show that Sierra Leone is its real habitat.

Thyridopteryx Sierricola, White. *Male.* Antennis subfuscis pallidulis, alis hyalinis, argenteo-nitidis, anticis ad basin plagâ atrâ longi-squamulatâ, thorace lanâ albâ sericeâ longâ induto. *Hab.*—Sierra Leone.

An interesting member of a genus which doubtless abounds in species. Mr. Westwood's monographs of these "Arcana" will require shortly a new edition. This should be figured with its chrysalis, cocoon, &c.

Of Orthoptera, there may be specified a curious Hymenotes with its Membracis-like aspect, a very interesting Mantidous insect allied to one described by Westwood.

Of Coleoptera there are several species, some of which are Myrmecophilous and Staphylinidous.

Of Geodephaga, an Acanthogenius, and a Cicindela, allied to nitidula.

Of Lamellicorns (and the Cetoniadous family in particular) may be specified Plæsiorhina recurva (*Fabr.*), *Schaum.*; Pachnoda fimbriata (*Gory & Perch*), *Burm.*—perhaps only a variety of P. olivacea; Pachnoda marginella.

Of Longicorns, the Mallodon and Hammaticherus, with their transformations, are interesting.

Of Neuroptera, the male Termes is worthy of notice.

And lastly, of the Spiders; there is the large Nephila, belonging to the same group as our garden Epeira Diadema, and which makes very thick silken ropes, which the late Mr. Whitfield once told Mr. White were so strong, that in the forest the wanderer must take care of his face, as he might, if careless, be hurt by coming against them.

Mr. Smith also exhibited some interesting nests of Hymenoptera sent by Mr. Foxcroft from Sierra Leone, amongst which was that of a species of Vespa, formed of a perfectly white material; and a leaf from the same locality covered with small purse-shaped galls, from which a minute black species of Thrips had been bred.

Mr. Westwood observed that although the species of Thrips were certainly insectivorous, yet that certain species were well known as being amongst the greatest pests to the horticulturist, puncturing the leaves of melon, cucumber and other greenhouse plants; the discovery that any species of this group formed galls was certainly quite a new fact, although from the great analogy with the Aphides, it was not improbable that they might be gallicolous, in the same way as certain Aphidæ forming the genus Byrsocrypta.

Mr. Walker also suggested that it was not improbable that the small finger-like galls found so constantly on lime-tree leaves, and of which he had never observed the inhabitants, were also the production of Thrips.

Mr. Westwood, in reference to the exhibition by Mr. Janson, at the preceding Meeting, of a minute species of Heteropterous Hemiptera found in ants'- nests, now exhibited the type specimen of his Microphysa pselaphiformis, together with a specimen of Microphysa myrmecobia of Germar, which last was identical with Mr. Janson's insect, although it was certainly not congenerical with the British type of the genus, which had abbreviated elytra, whereas they entirely cover the abdomen in M. myrmecobia, although destitute of an apical membrane.

Mr. Stevens exhibited a small box of insects sent home by Mr. Shield from Bahia.

Mr. Stainton exhibited some leaves mined by the larvæ of Nepticulæ also sent from Bahia by Mr. Shield, and being the first tropical examples ever brought to this country.

Mr. Stainton also exhibited specimens of Anthrocera Minos found on the west coast of Scotland; and the larvæ of Cemiostoma lotella, mining the leaves of Lotus major, in which they had been found in some plenty by Mr. T. Wilkinson.

Mr. Westwood would take this opportunity of correcting the erroneous view which Mr. Stainton had taken of the remarks made by him on specific differences, at the last

Meeting, asserting in the report of the Meeting published in 'The Entomologist's Weekly Intelligencer,' p. 95, that they went fully the length of maintaining the development theory,—that is, the theory advocated by the Lamarckian and 'Vestiges of Creation' schools, that an animal in a series of ages is able to develope itself into a totally different kind of creature; that a mouse, for instance, anxious to fly, is able after a long series of generations to acquire wings like a bat. Mr. Westwood, on the contrary, affirmed the identity and permanence of species, but insisted not only on the possibility of the modification of individuals composing the species, but also on the permanence of such modifications of specific forms through several or even many generations, so long, in fact, as the disturbing influences which produced the modification remained at work. It was by this kind of radiation from a central specific type that geographical varieties were produced and perpetuated; and thus, for instance, Mr. Westwood was induced to regard all the species of Ornithoptera allied to O. Priamus, recently proposed by himself and others, as modified sub-species or local varieties of that insect. So also were produced by the agency of man himself the different varieties of the silk-worm, so well known in the "magnaneries" of the South of France and Italy. He believed that if many of the Micro-Lepidoptera regarded by Mr. Stainton as distinct species were really such, they would exhibit tangible structural modifications in the length and form of the joints of the palpi, the number of joints in the antennæ, the structure of the veins of the wings, or of the tarsi. Mr. Stainton had, however, failed in describing any such characteristic modifications.

Mr. Stainton observed that he should consider that such differences as Mr. Westwood alluded to would be *generic*, not *specific*.

Dr. Gray maintained the existence of permanent and geographical varieties in all classes of animals, from Mammalia downwards.

Mr. Stevens exhibited a few insects collected in Madagascar by Madame Pfeiffer, amongst which was a fine species of Calandra.

Mr. Mitford exhibited a beautiful Noctua (*Brana calopasa*) from Ceylon, and gave the following interesting account of the habits of the species, communicated by E. L. Mitford, Esq.:—"One morning in March, about seven o'clock, I saw a cloud of these moths whirling and sporting round the trunk of a large tree. After continuing their gyrations for half an hour, they gradually settled in a large patch on the shady side of the tree, forming a sort of thatch, the wings of one row overlapping the bodies of the next, when they appeared like an excrescence on the bark, which they resembled in colour: this habit is very peculiar to this moth, as it is very uncommon for moths to go in swarms."

Cells of the Honey Bee.

Mr. Tegetmeier stated that he had recently made some experiments with a view of ascertaining whether the cells of the hive-bee were formed hexagonally, or whether such form was the result of lateral pressure, or rather the natural result of placing cells close together without any loss of space; with this object in view he had placed pieces of wax on the bars of one of "Wildman's" hives and watched the bees commence excavating therein; the cells formed, invariably proved cylindrical. They were, however, not in juxtaposition, as in the normal comb.

Mr. Tegetmeier also expressed his conviction that the cells of bees were also formed in the first instance with a hemispherical base, having observed the deposition

of the foundations of numbers of cells on the under side of one of the bars of his leaf-hive, which he had removed shortly after the swarm had been hived into it ; and also that the outer portion of each cell was also cylindrical until a fresh cell was added on its outer side, when the cell became an inner one, and its outer sides transformed into an hexagon.

Dr. Gray contended that the hexagonal form was undoubtedly the result of lateral pressure, if cylinders composed of any yielding substance (vermicelli for example) were placed side by side and subjected to such pressure, they were invariably forced into the hexagonal form ; he considered the attempt made by Natural Theologians to prove that the formation of an hexagonal rather than a cylindrical cell indicated the possession of a greater degree of Divine wisdom bestowed on the insect, was the greatest piece of humbug they had ever brought forward.

Mr. Smith had tried the experiment with cylinders formed of paper pasted together, but failed in producing the result stated by Dr. Gray ; he was not prepared to argue or to express any opinion upon the formation of the cells of the hive-bee, but he was prepared to show that the common wasp (*Vespa vulgaris*) constructed her hexagonal cells upon as predetermined a plan as a mason would build a stack of hexagonal chimnies. When the wasp commences the construction of her nest, having found or formed a suitable cavity, she begins by making three circular saucer-shaped receptacles, in each of which she deposits an egg ; she then proceeds to form other similar shaped receptacles, until the eggs first deposited are hatched and the young grubs require a share of her attention From the circular bases she now begins to raise her hexagonal cells — not building them up at once, but from time to time raising them as the young grubs grow : this is all effected by the mother-wasp, unassisted by a single worker ; and it must be borne in mind, that she works with no plastic material like wax, and that the hexagonal cells are built, course by course, like layers of brickwork. There was fortunately in a box upon the table a specimen of a small nest of a Brazilian wasp, (*Polybia*) : these wasps construct in the first place a comb of hexagonal cells, having, like that of the common wasp, circular bases ; over the first comb they construct a flat covering or roof, and by this time the grubs are all full-fed and the cells closed in ; the wasps now commence a second comb, and the flat roof serves as the foundation to build upon : they form no cup-shaped bases, but build up the walls of the hexagons as regularly as a mason would erect hexagonal chimneys ; in some instances, as might be seen in the nest before the Meeting, only the foundation of the first plane of the hexagon is laid down, in another case two, in another three, and so on ; but that wasps ever build cylinders, which afterwards become hexagons, in Mr. Smith's opinion, has no foundation in fact.

Mr. Tegetmeier added that he did not consider his experiments as conclusive evidence on the subject ; he intended to repeat them and to ascertain, if possible, what use was made of the wax taken from the excavations formed in the pieces of wax which he provided to the bees, and, with that object in view, proposed to colour the wax with Alkanet root before placing it on the bars of the hive.

Mr. Tegetmeier exhibited to the Meeting a new observatory hive which he had lately constructed, having the sides each composed of three plates of glass placed about a quarter of an inch apart, and each made perfectly air-tight at the junction with the frame ; by this contrivance he considered a nearly uniform temperature would be maintained in the hive despite external atmospheric changes.

Part 8 of the current volume of the Society's 'Transactions' was on the table. —*E. S.*

Northern Entomological Society.

June 26, 1858.—B. Cooke, Esq., President, in the chair.

Exhibitions.

The Secretary exhibited a box of Lepidoptera kindly furnished by Mr. Machin, of London; in the box there were bred specimens of Retinia Turionana and a short series of Eupithecia pusillata, which Mr. Machin has recently discovered near West Wickham, not at the New Forest, as was represented last year.

Mr. Constantine sent a box of Coleoptera, a present to the Society; in it were Stomis pumicatus, Bembidium monticolum, &c.—all interesting species.

Mr. Pugh exhibited an hermaphrodite Polyommatus Alexis, taken by himself on the coast; the male character being on the left side of the body; the female side is remarkably well-developed, the red spots being very large upon both wings.

Mr. Hodgkinson exhibited a supposed new Cemiostoma from Genista tinctoria.

The President exhibited a box in which were representatives of all orders except Orthoptera; the contents were the result of one day at Rivington, and gave abundant evidence of the richness of the district and the perseverance of the collector: amongst them were some very rare Diptera and a beautiful unrecognised Stegoptera.

A Member exhibited a box of recent captures, from which the Meeting at once learned what were on the wing at New Brighton.

Mr. Cooke then exhibited a number of small Cynips and parasites, bred from oak-galls, and beautifully set on cards; the setting was much admired.

Mr. Gregson exhibited a box of minute Coleoptera collected near Witherslack, in Westmoreland, and a box of Bembidia, collected near Preston and in North Wales; also a box of Eupitheciæ containing bred specimens of E. assimilata, E. absynthiata? *Doubl.*, E. ——— ? n. s., bred from larvæ taken in company with E. castigata larvæ on Lychnis dioica, but differing from that larva in having the marks on the back lozenge-shaped, observing that he has seen this species in cabinets among castigata, but could never reconcile it with that soft woolly-looking species; the specimen before the Meeting being a well-marked insect, the markings fine, but hard; also specimens of E. satyrata bred from heath, and several other species of Eupithecia, including a fine series of E. constrictata and E. succenturiata; also a box in which were specimens of a supposed new Eudorea taken on Engleborough Hill, near Engleton, a few weeks ago, about five hundred yards from the top (it is a dull-coloured fine species), and a fine series of Peronea potentillana bred from strawberry leaves early in June; also a plume which he cannot reconcile with any species in our present list: he also exhibited a lot of cases of a Coleophora upon small sallow (*Salix fusca*); it seems to prefer the variety which grows among the grass to the variety which forms clumps, though he had found a few larvæ on the larger variety; it belongs to the Anatipennella group, but wants the neck which is so conspicuous in all the known species in this group, in other words it is a pistol-shaped case without the barrel; it is

not scarce: he also exhibited Carabus nitens, taken by baiting; the plan adopted being to place a piece of ham-sandwich under a bunch of loose heath in the centre of a wettish swamp patch on the "moss;" these patches are perfectly bare, hence the beetles cannot get under cover when you go for them; the first bait placed at night produced three fine specimens of nitens next morning, — one munching ham, one eating bread and butter, the other asleep.

The Rev. H. H. Higgins also brought a box of Carabus nitens for distribution, and informed the Meeting he was now engaged upon a new Flora of the district around Liverpool, and asked the opinion of the Meeting as to the desirability of attaching the names of Lepidopterous larvæ to the plants on which they feed; the Meeting considered it desirable if a plan could be struck out, and requested the Secretary to take the responsibility as to the accuracy of the information tendered.

Mr. N. Cooke announced the discovery of the centre of Bankia Bankiana by one of the members, Mr. Birchall, and observed that thus another of the lost species would be made common; a discussion took place as to what species were yet to be rediscovered, in which strong language was used towards gentlemen who kept their localities a secret: it was observed, Weaver, as a dealer, had a perfect right to retain his information, yet entomologists generally had obtained more information from him than from some who are not called dealers.

The Secretary read an extract from a letter from Dr. Battersby, of Torquay, offering Acontia luctuosa to those members who wanted it, and informing the Meeting that he had captured Micra ostrina (!); also a letter from W. Hydes, who is now collecting at the New Forest for the members of the East Lancashire Entomological Society, from which it appeared he had been very successful until some London dealer had got him driven from the New Park, by telling the keepers he was injuring the young oaks.

Mr. Morrot exhibited some admirably got-up anatomical parts of insects under the microscope; they reflected great credit upon the manipulator, and gave great pleasure to the members present.

The President, on behalf of E. Newman, Esq., read the following paper:—

On Diminutive Cocoons of Cossus ligniperda.

"Trifling deviations from the ordinary mode of pursuing the path of life are much more interesting in insects than in ourselves: insects follow the leader as a matter of course; *we* only do so when it answers our purpose: insects are proud of following the leader; we do so by stealth, and often with confusion of face, and don't like to be caught out: insects are much more consistent in their general conduct than we are. It is on this very ground that when an insect deviates from its ordinary course we like to know the why and the wherefore, in fact we want to be told all about it. Now, there are every now and then to be met with small cocoons of Cossus, indeed so small that entomologists in general won't believe them Cossus at all, and suppose them to be some undiscovered species of Sesia, a trifle less perhaps than Apiformis and Bembeciformis, and a trifle bigger than Tipuliformis and the minors: under this idea the little cocoons are cherished, but perversely refuse to produce moths, being always infested by an Ichneumon, the familiar red-legged Lampronota setosa. This fact still adds to their value and to the mystery; for every one wants to know

what undiscovered clearwing always turns to a red-legged Ichneumon? These cocoons always occur in the usual mines of Cossus, sometimes in oak, commonly in willow, always very near the outer bark, always compact, tough, plentifully provided with silk, abundantly intermixed with the carpenter's chips; the Cossus grub was never more aptly described than when he was called Xyleutes or the carpenter. Only one entomologist to whom I have shown these cocoons was aware of their true nature, and that entomologist was Mr. Bond, a gentleman second only to Mr. Doubleday himself in his knowledge of the preparatory states of British Lepidoptera.

"Let us return to the cocoons. I have said they invariably produce Ichneumons which are always of one species. Does it then follow that when the larva of Cossus is stung by an Ichneumon, it invariably becomes dwarfed, and, dwindling to the dimensions of a moderate-sized Sesia, terminates its existence in this aborted form? Certainly not as a rule; on the contrary, the largest cocoons frequently produce Ichneumons, giving no indication of the contained parasite until he vibrates his iridescent wings on the exterior of his prison-house. The mystery admits of another solution. The larva of Cossus is of slow growth and of long life; some say it lives four years, some three, some two. Mr. Standish tells me he kept some larvæ after they seemed full-grown between three and four years; and that they pertinaciously and obstinately refused to chryssle at all until at last he threw them away, utterly disgusted with their seemingly unnatural conduct. Now, these insect Methuselahs are infested by a parasite which never enjoys the pleasure of seeing them face to face, but obtains access to them by thrusting her long ovipositor into their galleries, having first ascertained, by antennal investigation, that the gallery is tenanted; but not being in the least particular about the age or sex of her victim. Thus aiming at random, the egg may be deposited in the sleek body of a four-year-old, in the slimmer proportions of a three-year-old, or perhaps in the interior of a mere colt, a juvenile that has not yet kept his first birth-day. Now, although the longevity of the Cossus larva is well established, we have no evidence of the longevity of the Ichneumon larva; on the contrary, all the ascertained facts of its history go to prove that its period of existence is uniformly limited to a year; the egg of one year producing a fly the next. Hence, feeding away with the normal voracity of its tribe, the Ichneumon larva exhausts the Cossus larva in a few months, whether it be a one-year, or a four-year-old, always, however, allowing it life enough to form its ordinary cocoon, an operation with which no ichnemonizing seems to interfere; and hence also we have cocoons of varied sizes proportioned to the age of the Cossus, but quite independent of that of the Ichneumon. I think, therefore, that no doubt need now be entertained on the subject of these familiar little cocoons: and I hope speculative opinions as to their being 'something good' will cease; for of a certainty they are the progeny of veritable 'goats,' and possess the genuine fragrance of their sires, although their existence is terminated by the ungrateful guest they have nurtured while they are yet mere 'kids.' — Edward Newman."

The Secretary observed, in confirmation of Mr. Newman's remarks, he had repeatedly had diminutive cocoons of Cossus ligniperda sent to him for his opinion as to what new species they would produce, and remarked this paper settled a long-standing disputed question.

Mr. Gregson read the following

Notes on the Genus Oporabia.

"In a late number of the 'Zoologist' (Zool. 6103) my esteemed friend Mr. Doubleday differs from me about Oporabia filigrammaria and O. autumnaria (*D. L.*) being distinct species, and says he thinks Guenée correct when he unites these two species under the name of O. filigrammaria. It is with great reluctance that I venture to say I am at issue with these two profound naturalists, and, under ordinary circumstances, I should at once give way to the opinion of such men; but in the present case, believing that they have founded their opinion upon superficial observation of the perfect insects, whilst I form mine upon early stages and well-known economy of these species, I am compelled, much against my will, to protest against this desire to cut down species upon insufficient or imaginary grounds. The evidence which Mr. Doubleday brings to corroborate his opinion goes for nothing, because Mr. Edleston, the gentleman to whom he refers, does not know the species we take as O. autumnaria, the specimen in his cabinet under that name being most unquestionably a large example of O. dilutaria. To coincide with clever men is generally a safe game, but the best err sometimes, and I think this is an instance. If I am in error I shall be glad to admit and correct it when I find it out, or when it is shown to me; but I do not feel warranted in giving way because men who have had less opportunity than I have had to observe the habits of these two particular species differ from me, even though they be, as they unquestionably are, infinitely my superiors in entomological knowledge: there is a certain amount of self-respect which says do not always yield; form an opinion of your own, and act upon it; respect for our friends ought not to degenerate into servitude; and I feel sure both Mr. Doubleday and M. Guenée will excuse my differing from them, when I say that I have had the eggs and young larvæ of O. filigrammaria from Wharmton, near Oldham, and from the brushes near Staly Bridge, and have also taken the species on Moel Varna in North Wales, always in situations where heath and Vaccinium grow on mountains, and have never met with it on low ground. It is a common species, and may be found by separating the tufts of heath, and looking closely at the thickest stems, where it is difficult to see; none but a practised eye would suspect the small protuberance on the stem to be a moth. It appears in August and early in September, and comes out of pupa from 4 to 6 P.M., and where there are fir trees, as at Wharmton, it may be found *in copulâ* upon them about 5 P.M. I never found it *in copulâ* upon heath. My friend J. B. Hodgkinson takes it upon the highest parts of Longridge, near Preston; Mr. Garlick, of Leeds, who has taken great numbers of this species, says always high up. Mr. Almond also found it on the mountains. Mr. Hague has taken it in numbers, and the Bolton collectors take it on the moors, preferring the highest walls they can find, for though they may find a single specimen on the lower walls, as is sometimes done going up to the brushes, this seems only just to prove the rule. Weaver took all his filigrammaria on the mountains. Thus filigrammaria is always a mountain insect. I have a great objection to attempt to describe larvæ from memory, and shall therefore let this part of the subject stand over. The insect we take at Delamere Forest and elsewhere as O. autumnaria of Doubleday's List is a wood insect, and has been bred by Mr. Greening from larvæ found upon oak; it is a much larger insect, and always appears late in September and October, with O. dilutaria, and I have often taken it during the two first weeks in November. The elongate form of the under

wings in O. filigrammaria is a permanent distinctive character in the male, whilst the female cannot be confounded with the female of the October insect. The size of the insects, a point on which our friends seem to lay great stress, is of little moment, because the Petty Pool specimens, more south than so-called Manchester specimens, are quite as large as the Rannoch specimens, and generally much darker. I have often been asked, 'How do you separate autumnaria from dilutaria, as you take them together?' and I think the distinctive characters may well be remarked upon here: first, the antennæ in autumnaria are much finer, the insect is more silvery, and the marginal band on the under wings is not parallel with the cilia, as it always is in dilutaria, but cuts across the elongated point of the wing, and is consequently broader at this part; this character is better defined in some specimens than in others, and applies with still more force in filigrammaria, in consequence of the greater elongation of the under wing.

"I do not care to enter into the question of another species in this genus, further than to ask to be permitted to think we have one, as I shall be quite willing to let those friends who have never seen it think we have not one; but I may call your attention to Mr. Weaver's note (Zool. 3495) on the genus Oporabia, and mention that he made a journey from Birmingham to Liverpool purposely to see my specimens, and unhesitatingly pronounced them a distinct species. It may be said Weaver had an object in multiplying species, but it is uncharitable to say so of him; for my part I would rather take his opinion, founded as it was on practical and close observations of the insect; where it appears, how it sits, how it flies, when it disappears, &c., go for something, even when we do not know its food-plant; but we know it to feed upon a tree, whilst the species to which it is allied occurs frequently where no trees are, and at other times where fir alone will grow, as at Moel Varna.

"I fear I have extended my remarks over too great a space, but I think I should not do justice to this question if I did not give the opinions of other practical entomologists, and shall select extracts from a letter kindly furnished by Mr. Garlick, merely observing that Wharmton is always a cold, late district; rising as it does on the moors, it has not the protection from the winds which the adjoining hills of the 'brushes' range have, and consequently such hills as Highrige are always two weeks earlier there. I have found filigrammaria wasted on the 12th of August, rather a particular day to sportsmen in this district.

"Mr. Garlick says, on the 16th of August, 1855:—'I took two good specimens of filigrammaria, just out, on a fence wall. This is the earliest date that ever I met with them. I took 120 specimens, in fine condition, from then to the 4th of September; this I should say is the height of the season for them here, but I did not see a specimen of any sort after the 14th of September.'

"August 24, 1856.—'Had been on the look out for them two weeks. Took three specimens, just out, on the walls, and two on the trunks of fir trees. This year their height was from the 1st to the 6th of September; on the 15th they had dispersed.'

"August 19, 1857.—'Found filigrammaria, just out; it was in fine condition on the 26th and 27th, but on the 10th of September it had gone to "Davy," and I could not find one afterwards.'

"When we allow for the coolness of this district, as compared with the sheltered localities I and others have taken it in, we shall find that these dates coincide with what might naturally be expected. Being desirous of laying the facts before you,

and having no other object in view, I leave you to draw your own conclusions as to whether the small August insect known in the northern cabinets as filigrammaria, and the large October insect known as autumnaria of Doubleday's List, are one and the same species; I say not."*

After which a few remarks were made upon the question, the Meeting being of opinion that O. autumnaria of Doubleday's Catalogue and O. filigrammaria are two distinct species; it was observed that O. autumnaria might be a variety of O. dilutaria, but could not be admitted as a variety of filigrammaria. On the distinctions between O. autumnaria and O. dilutaria being pointed out, the Meeting proceeded to render the thanks due to the various friends and members, who, by their kindness, had contributed to the pleasure and instruction of the members and friends present, particularly to Mr. Battersby, for his liberal offer to give specimens of luctuosa to those who were still in want of them.—*C. S. G.*

Zoological Society.

Tuesday, July 13, 1858.—Dr. Gray, V.P., in the chair.

Mr. Gould read a paper on a new species of ptarmigan, the skin of which he exhibited to the Meeting. It was a native of Spitzbergen, where he believed it was plentiful, and was brought to this country by Edward Evans, Esq., of Neath, who shot it during a visit to that part of the world in the summer of 1856. In size it consiiderably exceeded our common ptarmigan. Mr. Gould proposed the name of Lagopus hemileucurus for this species.

Mr. Gould also read a paper containing descriptions of two new species of the family Hirundinidæ; one, an Atticora, from Guatemala, for the introduction of which Science was indebted to George Ure Skinner, Esq., he characterized under the name of Atticora pileata; the other, a Chelidon, from Cashmere, which he proposed to call Chelidon Cashmeriensis, was discovered by Dr. A. Leith Adams, of the 22nd regt.

Mr. Sclater exhibited a specimen of an apparently undescribed species of Buteo from the collection of the Norwich Museum, which he proposed to characterize as Buteo fuliginosus.

Mr. Sclater also called the attention of the Society to some birds collected by George Cavendish Taylor, Esq., during his journey across the Republic of Honduras,

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* I am always pleased to find a question of this kind investigated on the spot: it is the only way in which such *questiones vexatæ* can be settled. I would nevertheless suggest to Mr. Gregson certain queries which still remain open. What is the difference between the larvæ of the three species? Calling them A, B and C, may I ask this question,—When the eggs of A are reared to the imago state, do the moths *always* prove identical with A? The same of B? The same of C? Has it been positively ascertained that the food plants of A, B and C are different? Mr. Gregson hints this, but has not established it. Is it certain that neither A, B nor C is a second brood of either of the others? May not autumnaria be a second brood of filigrammaria; filigrammaria is wasted on the 12th August, autumnaria in perfection in October. Mr. Gregson has the opportunity of solving these questions: it would be a boon to Science if he would do so, and would supersede the necessity for expressing mere opinions.—*Edward Newman.*

along the line of the proposed Inter-Oceanic Railway, and read a list of the species procured, thirty-nine in number, accompanied by remarks on their synonymy and distribution.

Mr. S. P. Woodward read a paper on the genus Synapta, by himself and Mr. L. Barrett. Two species of Synapta (marine animals remarkable for the microscopic anchors in the skin) are found on the British coast. 1. S. digitata, *Mont.*, ranging from Scotland to the Mediterranean, occurs in Rothsay Bay, west coast of Ireland, Devonshire, Cornwall, also in Vigo Bay (Galicia), and Trieste (Adriatic). 2. S. inhærens, *Mull.*, which ranges from Norway to Brittany, has been found at Aberystwith, Criccieth, Falmouth, and Bantry Bay. A new species, called Synapta bidentata, was described as having bifid anchor-flukes, and oval plates perforated by many circular holes, decreasing in size from the centre to the circumference. The specimens were collected in China, by the Rev. G. Vachell, and are three inches long, with twelve tentacles, each having four lobed digits.—*D. W. M.*

Reason and Instinct. By the Rev. J. C. Atkinson, M.A.

The second position which we are, if possible, to establish, is—

That, at least presumably, as man emerges from the uncivilized or savage state, Instinct, by degrees, ceases to have any predominant power, and, infancy past, in no case utterly excludes the operation of Reason.

It must be observed at the outset that we shall meet with an inherent, it may be an almost insuperable, difficulty in the way of successfully maintaining this position otherwise than by presumption. I mean that, from circumstances I proceed to notice, observed cases or facts must, it is likely, always be too few and too special to afford grounds for a thoroughly safe induction in such an inquiry as the present. It is, I suppose, almost an axiom that self-originating civilization never had or can have existence; that if any nation or people have ever passed through any of the stages or processes implied in the term civilization, the fact of their having done so is a sufficient proof that some civilizing agent, independent of and external to themselves, has been at work among them, whether for a longer or shorter period, whether with more or less continued and energetic action. That agent may have been exclusively human, or partly human and partly superhuman; but in neither case have they left any distinct record of either the progressive or the completed effect of their agency, which is at all sufficiently available to us for deciding the amount of corresponding psychical change of the kind in which we are interested.

What I have called the human agency may have been carried out by the irruption and indwelling of an at least comparatively civilized community among the hitherto uncivilized, as was the case with our own British ancestors from the period of the Roman conquest of this country to that of the final departure of the conqueror from its shores. Or it may have been, though considerably more rarely and limitedly, by the long-continued visits, for the purposes of commerce,* of a civilized to an uncivilized community; or in one or two other but less potential ways which might be mentioned. In the case of the other agency specified, though the human agent has often, perhaps usually, been weak as to his own proper agency or influence, both as to its kind and degree, as contrasted with the work before him, yet his ability for that work, however defective *per se* or in this sense, has been more than supplemented by the energy of the superhuman element. I refer of course to the case of the Christian missionary of all ages, when—himself a weaponless, despised, persecuted man—he has gone out to make converts, not with the aid of fire and sword, but by using only the arms of the Gospel, and possibly the arts of a higher human culture, to aid him in his labours. And as an instance of a process of civilization thus induced I may refer to what is going on in our own time in New Zealand.

But still, except in the case just cited, and one or two analogous ones on even a smaller scale, I am afraid we must say that we have no records existing which describe the several phases of the mind and nature of the one-time savage as he passed on along his transitionary course from the savage condition through the progressive stages which finally conduct to civilization, possibly to high civilization; at all events, none which describe those phases with sufficient minuteness and precision to enable us to trace with satisfactory distinctness the concurrent relative changes in the subtle influences of Reason and Instinct. None but the agents employed could, for the most part, trace or record the effect they produced. In few cases were they qualified or disposed to note those effects in their psychical bearing; and thus as to points of utmost interest to us in our present discussion it would be altogether vain, should it happen that records of civilizing influences and effects on any given people in any given age could be produced, to look in them for any precise or reliable

* It is perhaps possible that some influence of this kind had been at work among our remote forefathers anterior to the Roman advent, because, though certainly "uncivilized" by comparison, they cannot with strict truth be said to have been "savage" at that period.

information. Thus I believe it may be stated that the sources of information are both few and bare as to the changes in psychical development which accompanied the progressive advances towards and in the early civilization achieved by our own nation, or by the French or German nations. Perhaps something of what we need ought to be met with in the history of the Russian Empire, or rather of portions of its subjects. Certainly some of those subjects have emerged from at least comparative barbarism quite within the epoch dealt with by modern history, and I believe that whenever we can meet with authentic accounts of such emergence we shall see there is much to support the view we have enunciated in our present proposition. Unfortunately those accounts are both rare and scanty.

Doubtless we may permit our eye to rest on many a tribe or nation in a state of partial and incomplete civilization, certainly more or less removed from the savage state. But almost without exception we lack authentic accounts of the remote antecedents of these tribes or peoples. They may have been, for ages beyond the memory of history, in a state such that it would be difficult to decide accurately whether it were one of progress or of regression as to essential civilization. Such, very probably, is the case with the people so happily termed by the *Times*' special correspondent, a few weeks since, "quaint barbarians;" and very much the same remarks may be made in reference to the numerous widely-spread Nomade* tribes or hordes who people so large a portion of "High Central Asia," and, omitting others, to the inhabitants of certain important and populous regions in Northern and Central Africa. How long their habits have been Nomadic, from what source they originally sprung, and whether the assumption of Nomadic habits was a step in a backward or forward direction, are all questions involved in much obscurity.

But if we are unable to trace backward the advances made to the comparatively civilized from the savage state in such cases as those just instanced, it is of course obvious that we can be in no position to pronounce upon what have been the accompanying changes in the sway of instinctive impulses and the influence of rational determination, as illustrated in the experience of any of those peoples which may become the subject of inquiry in such matters. The most promising course open to us appears to be to ascertain as nearly as possible what general rule as to the presence and influence of Instinct in uncivilized or savage man may be laid down in conformity with the

* The argument derived from the form and dimensions of the skull I postpone for consideration in a future division of the paper.

most accurate and widest possible observation, which we have endeavoured to do when attempting to establish our first position; next, to deduce a similar law as to the comparative presence and influence of Instinct in men living in communities that are, and have been for a lengthened period, more or less highly civilized; and then, by contrasting these two rules, and checking the result by comparing it with the observed psychical condition and peculiarities of such partially or imperfectly civilized peoples as are reasonably believed to have been at some anterior period of their history in a savage or nearly savage condition, to deduce thence the presumable law as to the presence and influence of Instinct in communities passing through the process of emergence from barbarism to at least comparative civilization. And if, besides, we are enabled to adduce such instances as that of the New Zealanders, already adverted to, and, after trying our presumed law by them, find it enunciates principles in no way inconsistent with the observed phenomena, we have so far a confirmation of its truth and validity.

What, then, is the law of Instinct as applicable to man living in a condition, almost all the elements of which are in a greater or less degree referrible to or influenced by civilization; say, to the inhabitants or frequenters of the very centres of civilization in England, France or Germany?

We find the instinct of Fear or Self-preservation so limited and so modified that there is very little analogy or opportunity for comparison between the actions of the savage man or the wild beast under this influence, and those of civilized man under the influence of what we usually understand by the word Fear. Exact parallel between the proceedings or expedients of the savage when seeking to elude his enemies or escape danger, and any of the actions of an ordinary member of civilized society, there is none. As to what we have termed the instinct of Sexual Love, it exists past all doubt, but under circumstances which, except in some, by comparison, few cases, either anticipate its actual development or true influence, or else, from the careful restraint or repression to which they cause it to be subjected, effectually forbid alike its real operation or any evidence of its existence. The instinctive influence of Association certainly exists, and perhaps at least to the full as strongly as in any uncivilized community. The eager craving of our childhood, new every day, for companions of our own age; our gratification when the craving is supplied; the fervid friendships of our school-days; the habits of our maturer years, with the continuous interchange of

mutual services and reciprocal dependency which characterize them; all testify to the existence, and the powerful, however little suspected, underworking of the Social Instinct. And yet all has to give way and disappear under the expediencies of a highly artificial and arbitrary state of society, so far, that is, as the inevitable human interdependency will permit. The next class of instinctive impulses we come to is that we have designated by the somewhat awkward term Food-craving. Of this, too, it must be said that it exists and operates strongly, and yet under such modifications and restraints that its results are greatly disguised, and its influence for the most part quite unsuspected. The elementary instinct certainly remains in innumerable instances: however little it may be usually recognised, there are many little circumstances which may and continually do lead to a manifestation of its continued vitality. It is really a most curious and significant fact, that, however remote men's lives have been from what are called field sports, however little awake to the existence of such pastimes their understanding has hitherto been, scarcely one in a thousand can be singled out who is not at once, and possibly even strongly, vivaciously interested if brought into contact with the active pursuit of some species of game. Nay, it is no uncommon thing for a thorough-bred cockney, a true *indigène* of "The Town," on visiting his country cousin, to become a partaker in and quite engrossed by the mysteries and enthusiasms of a rat-hunt or even a mouse-battue. The merest child, again, scarcely able to do more than toddle by himself, "wants" the rabbit or the bird which arrests his attention by its flight; as soon as he is a little more master of his limbs gives eager chase to the insect or reptile; counts it a day to be marked with white on which he first captures the bird that has flown in at the window, or unwarily entered his awkwardly-constructed trap; or, with his stick and string and crooked pin, magnifies in imagination the minnows which, unharmed by hook, rob him of his bait, into most unminnowlike dimensions, and glories for a week over the scaly infant which in some inscrutable way contrives to become his "first fish."

Still Mr. Briggs or even Gordon Cumming "takes the field" in a somewhat different way from the otter or the lion, and with an equipment somewhat varied from that of the red man of North America or the Balonda of South Africa. And, allowing all that may be urged here,—that Gordon Cumming in stalking an antelope, a buffalo or an elephant, or Mr. Briggs in trying to get near enough to a capercailzie

to shoot it,* is doing no more, or acting no otherwise, than a lion or a bear in instinct-directed pursuit of their several kinds of prey, or than the savages of America, Africa or Australia in their almost equally instinctive prosecution of the chase,—still it is unquestionable that in the great mass of a civilized community, as to the processes of its every-day life, those impulses of Instinct which we class under the head of Food-craving are much as though they had no real existence or influence. If directed by them at all, civilized folk are directed by them, we must say, to the butcher, the baker and the brewer.

We have now only those impulses which are classed under Migration and Local Direction left for notice. Of the latter we must at once say that it is lost or entirely removed; of the former, that it exists still, but is greatly modified both in intensity and mode of application. It is individual now, rather than collective; the result of deliberate counsel and volition, rather than of spontaneous, restless impulse.

The result of our inquiry, therefore, would seem to be that Instinct

* I take the circumstance stated below from Mr. Couch's 'Illustrations of Instinct,' p. 185. The cock of the woods is said to be so extremely shy that he can rarely be met with except in the pairing season; but then, "every morning he renews his song." While engaged in this occupation, and its attendant ceremonies of running with drooped wings and clucking, it seems he may—as is the case with several other birds at such times, *e.g.* the corn-crake and the ruffed grouse—be approached very closely; indeed, near enough sometimes to be caught by the hand. A man in Sweden goes out one morning to shoot these birds, and hearing one, makes his approaches in due form. "He could not see many yards before him in the forest, and only followed the direction of the sound. While standing motionless, in expectation of the renewal of the bird's call, he thought he perceived a dark object on one side of him, but it did not engage much of his attention; and at the usual note he moved on towards the game, but was surprised to see the black object had advanced in an equal degree, and now stood in a line with him. Still he thought more of the bird than anything else, and approached close to it before he perceived that a large bear stood within a few feet of him; and in fact just as they were both about to spring on the bird they caught sight of each other, and each retired." However, after a few moments both man and beast resumed their "stalk," which ended in the death of the bear by a shot from the man's gun, who was, however, so much startled that he did not even wait to see the result of the discharge. Again, "when a lion is very hungry and lying in wait, the sight of an animal may make him commence stalking it. In one case a man, while stealthily crawling towards a rhinoceros, happened to glance behind him, and found, to his horror, a lion *stalking him;* he only escaped by springing up a tree like a cat." (Livingstone, Miss. Travels, p. 138). A similar instance is recorded in Andersson's 'Travels in Africa,' in which the author himself was stalked by a lion, step by step, as he carried on the stalking process towards some game animal.

doubtless continues to exist and even to operate in civilized man, but so modified, and under such circumstances of limitation and repression, that some of its impulses which are equally remarkable aud energetic in the savage man cease to be perceived or exerted; others are so checked or domineered over by design or expediency that their power of origination is often obscured or doubtful; while the remainder, which appear to be the inalienable inheritance alike of the entire human family under all circumstances, physical and psychical, and of the whole or not a few of the lower tribes of animals, are so thoroughly subject to the power of Reason or its results, that we feel ourselves, as it were, naturally led to the conclusion which stands as our third position, viz., That in a fully civilized state Instinct still survives, but is so restrained and regulated in its operations by Reason that it becomes comparatively difficult to allege any but a very few of man's ordinary actions as greatly influenced by it, or to distinguish between the workings of Instinct and the rulings of Reason in actions which are, according to analogy, originally due to or prompted by Instinct.

Now, bearing this conclusion in mind, and recalling that which we came to after passing in review the evidences of instinctive workings afforded in savage life, it seems to be a safe inference, that as any given race of men outgrow the pursuits and habits and influences of wild life, and acquire in lieu of them others more appropriate to a more advanced position in the scale of human progress, there should be a corresponding and contemporaneous inverse change in the operative power and influence of Instinct and Reason; that, in other words, in the progress of man from a savage to a cultivated condition Instinct holds a kind of middle standing in energy and active influence.

Now, it is perhaps hardly necessary to observe that there are but few Nomadic tribes whose habits are simply and exclusively Nomadic. Very generally, throughout the various subdivisions of the nations usually distinguished by that epithet, the men are found to be keen and persevering hunters. In not a few instances they not only employ the dog in the prosecution of the chase, but they enlist in the same service the instincts of others of the lower animals; the falcon for instance, and a species of hunting eagle. And, in whatever degree they are keen and successful hunters, their faculties show a degree of approximation to those displayed and exercised in so remarkable a manner by the savage in the pursuit of any of the different varieties of his game, — a display so remarkable, indeed, that, as we have

already had occasion to notice, it naturally suggests both a comparison with the instincts of a predaceous animal similarly engaged, and the conclusion that in both cases the phenomena observed are due to the same operative cause.

Beyond this, those of the pursuits of the peoples designated, which may be described as the Nomadic proper, call for the exercise of some of their instinctive faculties in preponderance over their intellectual; and in their quest of pasturage or water for their manifold flocks and herds one is reminded again of the instinctof wild creatures, in that operation of it, namely, by which the undomesticated congeners of the animals these Nomades tend are guided when under the pressure of the wants in question; and not less so in the foresight and precaution against the attacks of predatory animals, so strongly suggestive of the similar foresight and precaution practised alike by the wild animal and the wild man.

I think, too, we may observe an approximation to the peculiar instinct of Local Direction or Self-guidance seen in the Red Man, in the apparent readiness with which they direct or guide a stranger to a distant place, only the general direction or bearings of which they are acquainted with. In Mr. Atkinson's interesting 'Travels in Siberia and Mongolia' the reader finds perpetual, and occasionally very striking, illustrations of the several points we have thus successively brought forward.*

Now it must be observed that, with respect to some of the Nomadic peoples, it is certainly a matter of probable conjecture, if not more, that their present condition is one of advance, or, at the least, one to which they have advanced, from a condition of barbarism. Several of the off-shoots or subfamilies of the great Nomadic nations are known to have been, strictly speaking, barbarous when first named by history, and to have passed on since from that condition to one of comparative civilization, in a few cases to really a high degree of culture. Others are known as yet remaining almost barbarous, perhaps we might say, rather, savage. And possibly it might be a not unfair inference, that, generally speaking, the possession and tendance

* I do not here, as I have usually done, append quotations as the authority for the statements in the text, or as the ground on which our arguments or inferences are founded, because the doing so in a satisfactory or sufficient way would require the extract of lengthened passages, which would demand increased space for a paper that already, I fear, bids fair to be too long. But I think the conclusions stated in the text are fully warranted by numerous statements and narratives met with in all parts of the book in question, as well as in others.

of large flocks and herds is *de facto* a presumption that their owners, wanderers though they be of necessity, are on the upward march—however much the final accomplishment of that march may have been or may yet be delayed by repeated and lengthened halts—from barbarism or savage life to the more cultivated life of agriculture and the useful arts. And if so, bearing in mind the above-noticed peculiarities in respect of instinctive influence as displayed in the doings of several of the Nomadic peoples, we have so far a corroboration of the views embodied in the conclusion we arrived at a few pages back.

Turning next to the illustration afforded in the case of the New Zealander—and there are other and similar experiences of the same kind—we find our conclusion further borne out and confirmed. With all the instincts of the savage in full power and operation, and with almost more than the full complement of savage ferocity, antecedently to the time at which the missionary began to exercise upon him the humanising and elevating tendencies of Christianity, and of association with some of the better specimens of European humanity; yet in the course of a comparatively brief epoch he has been brought voluntarily, even eagerly, to adopt not simply many of the customs, but even some of the arts of civilization, with all which that implies of the stronger as well as more evident working of his intellectual faculties; while, what is perhaps even more to our purpose, he manifestly retains, though he has now little use for or desire to exercise them, his old instinctive powers and qualities, and candidly avows that he could easily, if need were or inclination disposed him, return to what was once his wonted exercise of them. But the question, how long, after how many generations, he could thus achieve a resumption of his forsaken instinctive habits, is one which it needs no elaborate system of discussion to reply to. A few years would so far dull the senses left unpractised in comparison with what was his wont in his savage days, and deaden his sensibility to impulses long disregarded, if not discontinued,—which on physical grounds, impulses such as those under discussion are, most easily come to be,—that it would be no easy matter to him to be again the man he once was in the endowments and attributes of savage life; while, as to what would be the condition of those of the second generation, born and brought up among many of the usages of civilized life, and utterly untrained in those of their fathers' *quondam* life, there can be no question that Instinct can never be in them what it was in their fathers, except under circumstances which will be brought under review in the next division of the paper.

In speaking of the civilization of the New Zealanders I am desirous to be understood as not intending to imply more than the facts will warrant. It is yet a question, I believe, whether the civilization of New Zealand and Polynesia (not to name other sites of the species of civilization under mention) is likely to be permanent,—whether, in other words, it has in it the capacity of self-sustentation. At present the impression seems to be that, except under circumstances providing a continued supply, and for some time to come, of external teaching, example and influence, the degree of cultivation attained is not likely to be maintained. It appears that up to a certain point instruction is with the utmost ease received, retained and assimilated by the learner, but that there is a point at which development of this sort stops. "The masters say," speaking of some of these islanders (Walpole's 'Four Years in the Pacific') "that in all the early parts of their education they are exceedingly quick, but not in the higher branches; that they have excellent memories, and learn by rote with wonderful rapidity, but will not exercise their thinking faculties." Some of these scholars were full-grown men, others little children. This fact appears to me to be exceedingly interesting; and it seems to be, so far, observable in all or nearly all newly-civilized savages. It is as though there were a barrier, which they could not pass, at this point of their intellectual improvement. And there is another circumstance of not less interest in connection with these people and the question of the probable permanence of their newly-induced culture; I mean that there is an only too-obvious infirmity or instability of will among them. Singularly impressionable, equally ready and able to forsake their own customs or usages, and rapidly to acquire new ideas and new habits, they yet require to be kept as it were "in leading-strings and must remain so until a generation of more solidity of will arises." ('Quarterly Review,' December, 1853). I termed the two facts just noticed interesting, and indeed I think they are. I hardly know how to state the inference they seem to me not so much to justify as to require, in such a manner as not to be offensive to the sticklers for the prerogatives and supremacy of the human race in contrast with the brute races. But it does seem as though the savage,—the uncultivated, uncivilized human being,—by his incapacity to exercise fully, if at all, his higher intellectual faculties, and by the comparative feebleness or instability of his will, not only justifies our position as to the comparative predominance, in certain particulars, of his instinctive powers and propensities—for the latter, it is at once apparent, can only be developed in inverse proportion to the intelligence

and will—but affords us one more justification likewise for considering the human species as a part of the animal creation at large, and therefore not only in drawing analogies between his instinctive endowments and those of the lower creatures, but in asserting that they are essentially of the same nature in each of the two cases, because in the whole of the animal creation beneath man, which can be properly said to be possessed of any intellectual endowment, we see displayed in its highest degree the same volitional impotency conjoined with complete disability to employ the higher intellectual powers,—a disability which amounts to, if it be not rather the consequence of, complete deprivation of all the higher powers of mind.

J. C. Atkinson.

Scent.—In his interesting paper on scent Mr. Atkinson says (Zool. 6136), "No dog can hunt either feathered or four-footed game in the snow, even for ten yards, by the nose, except in so far as has just been mentioned," namely, "a freshly moved rabbit or hare for a few paces, evidently taking up the scent from the very recently impressed footsteps." My own experience, which has been considerable, has led me to form a different opinion, the grounds whereof I will proceed to give. I well remember once, when crossing some fields in a deep snow, coming upon the track of a hare in the precise course I was about to take. Merely for amusement, and with no view of finding the hare, indeed without thinking whether it was practicable or not, I pointed out the marks to my spaniel, whereupon he poked his nose into the impression in the soft snow, pausing a little to try for scent, after which, to my surprise, he, entirely of his own accord, deliberately traced the footprints for perhaps 150 yards or less, till, in a small patch of cover, he started the hare from her seat. The dog was a remarkably good one, especially safe and persevering upon a cold scent, but, as he was likewise a very sensible old fellow, he may very possibly have been assisted, at least, by sight in following up the hare, though I feel confident he was too knowing in his business to have undertaken the chase, had not his nose assured him it was not hopeless. The time of day must have been not earlier than 10 A. M., nor later than 11, so that we may reckon the footmarks to have been made probably not less than two or three hours previously. I possess however far stronger evidence than the above in support of my opinion. Though a heavy fall of snow necessarily put a stop to direct pursuit of partridges and pheasants, I have so repeatedly fallen in with them casually at such a time, beside woodcocks, snipes (the latter however in unfrozen springs and ditches), water rails, and moorhens, that I can state confidently the dogs never seemed to find any unusual difficulty in hunting them, this too in places where it was hardly possible for them to be aided by the eye. For shooting rabbits to beagles* a general carpet of thick snow

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* With good dogs, in woods or other cover of some kind, rabbits will afford abundant sport, though hardly satisfactory to those who cannot work for their game. Formerly I knew a pack of four or five couples of small beagles, kept exclusively for

used to be deemed a favourable opportunity. I have often been out successfully when the snow was quite fresh and soft, though it was vastly more agreeable, as well as easier for the dogs, when some continuance of frost had compressed the snow, and rendered the surface harder. In such a chase as that by beagles, or indeed by many dogs of what description soever, whether in cover or not, the pace will be too fast to admit of any assistance from sight, so that the pursuit must be maintained by scent alone, and in my own experience I never was sensible of any material difference in the style of the dog's hunting when there was snow upon the ground and when there was not. But though snow is no obstruction to hunting rabbits in woods or on open ground, it is a very decided difficulty in furze-covers or patches, because, when the snow first falls, it lodges on the thick top of the furze, whence it is shaken down by the working of the dogs beneath, and buries, partially or entirely, the trail of the rabbits which may be on foot. Frost without snow was never considered any impediment, but rather the contrary, to cover-shooting of any kind.—*Arthur Hussey; Rottingdean, Hants, July* 13, 1858.

A Nest of Montagu's Harrier.—About the first week of July a nest, containing three young harriers, was discovered on a rushy marsh near the Ranworth decoy. The old birds had been watched by the broodman flying backwards and forwards with food for their young ones, and on making a search the nest was soon found. Of the three young birds one only was feathered, the next partly feathered with down, and the smallest covered with down only, showing that the hen bird had begun sitting after laying the first egg. In the aviary of J. H. Gurney, Esq., M.P., at Catton Park, these nestlings have thrived wonderfully. At this time the youngest is full fledged, and all of them exhibit the rich chocolate tint of plumage forming the immature state of this species, and the facial disk is in all fully developed. About the same time that these were taken, another nest of young harriers was also found in the neighbourhood, by some men whilst mowing the marshes. In this case the old bird was snared on the nest, but I regret to say neither old nor young preserved.—*H. Stevenson; Norwich, August* 7, 1858.

Emberiza nivalis.—I write to record an interesting fact concerning the snow bunting (*Emberiza nivalis*) which has recently fallen under my notice, as well as to reply to the remarks from Mr. Doubleday with reference to a communication I made respecting the same species (Zool. 6015). My friend Horace Waddington, Esq., of University College, Oxford, spent a few days on Lundy Island, towards the end of this last May, and while there, among some other interesting ornithological specimens, obtained a fine Emberiza nivalis, a female bird in good condition. When the bird-stuffer in Barnstaple came to skin and dissect this bird, he found eggs inside her almost advanced to maturity. This shows that this species, although one of such high and cold latitudes, may occasionally linger behind, and nest in the warm south. I would also mention that among some eggs from Oxford, brought me in the month of

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rabbits, and so well trained, that I have seen a hare jump up under the nose of one of the dogs, which took no notice whatever. Of course, shooting at a hare before those beagles was most strictly prohibited

June, 1857, by a boy I employed to collect there, was one which bore a strangely close resemblance to the eggs of the snow bunting. But beyond the bare possession and presence of the egg, I had no other data on which to ground my conclusion, for the boy could neither tell me what the nest was like from which he took the egg, nor where it was he obtained it. I at the time (with sundry doubts of reservation) adopted the opinion that Mr. Bond was kind enough to give me on the matter, which was that the egg in question was probably one of the numerous varieties of the egg of the common E. citrinella. Mr. Doubleday brings down upon me the great authority of Selby, united to his own experience and observation. Although feeling that a humble tyro like myself ought unhesitatingly to bow submission before such powers, yet I must either hold that if it be a general rule for E. nivalis to avoid pitching upon trees, my snow bunting was the exception to prove that rule; or else must deem myself to have been for some three weeks the victim of an optical delusion, and that my bird was not even the shadow of a shade, having no existence whatever beyond the intangible limits of my mental vision. But for the following reasons I must remain firm to my belief that the bird I saw was a bird, genus Emberiza, species nivalis. The field I saw it in was a large one bordering on a salt marsh, part of the field lying in fallow, part green with turnips. The field has a high hedge round it, in which on one side stand two or three elm trees. In this field I must have started this bunting more than a dozen times during the space of three weeks. The bird used when started to settle again among the turnips a little farther on, never allowing me to get within shot, and if I persisted in following it up, would at last fly off and alight on the hedge, or else on one of the trees. One wet and windy day, when looking after snipe, I as usual started the bird out of the turnips, and although it got up at a considerable distance, fired at it, and I fancy struck it slightly, as it fluttered down into a hole in the hedge, and here I got so close to it that I was just about to take it up, deeming it badly hurt, when it flew out, was carried off by the squall, and I unfortunately saw it no more. Still I had been quite close enough to be in my own mind quite certain as to the bird's identity. With regard to its being of a white colour, I do not think this fact has any weight towards proving that my bird was not nivalis. "A few years ago" (I quote an extract from a letter of Colonel Montagu which is to be found in Yarrell, vol. i. p. 426) "I shot more than 40 (snow buntings) from the same flock, during severe weather in the month of January, hardly any two of which exhibited precisely the same plumage, but varied from the perfect tawny to the snow bunting in its whitest state." In conclusion, Mr. Newman's suggestion that I might have seen the pretty little Muscicapa atricapilla, and have mistaken it for E. nivalis, will not hold; *first*, because in the winter months a summer visitant like this little flycatcher would find it difficult to obtain sufficient food to sustain life; *secondly*, because M. atricapilla is a rare bird with us in Devonshire, and I have only seen it twice, and that at very distant intervals; and *thirdly*, because though I candidly confess myself a tyro, yet I do give myself credit so far as to think it hardly possible to so palpably blunder in the very rudiments of Ornithology as to confound birds which differ so widely in their habits as a flycatcher and a bunting. —*Murray A. Matthews; Raleigh House, near Barnstaple.*

Note on the Blackbird sucking Eggs.—A few days ago one of my brothers observed a blackbird discussing what he evidently regarded as a great dainty. On my brother approaching the bird reluctantly quitted his meal, which was nothing less than an egg of the common song thrush. Has any ornithologist noted egg-sucking to be a failing of other blackbirds? or is this feat of gormandising a unique instance?—*Id.*

Is the Red Grouse of Britain really distinct from the Norwegian Willow Grouse? —The red grouse (*Tetrao scoticus*) has hitherto been considered peculiar to the British Isles. I must confess, for my own part, I could never comprehend why it should be absent from neighbouring countries possessing all the necessary features required by the bird. Now comes the question,—Is the red grouse really distinct from the willow grouse of Norway (*Lagopus subalpinus*, Niellsen, *Tetrao Saliceti*, Temminck)? My own opinion is that they are one and the same species, the difference in plumage depending upon the climate and food, the one species feeding principally on heather and ling, while the food of the other consists mainly of small apical willows, juniper, &c.* This may at first appear a bold assertion; nevertheless, I feel convinced that when the subject is looked into by competent parties it will be found correct. Perhaps I ought now to state why I have come to this conclusion. About ten days ago I was staying at Hjerkin, in the Dovrefjeld Mountains, close to Suechœttan. Making from this station an excursion to some snow fields (at an elevation of perhaps 6000 feet) for the purpose of collecting Diatomaceæ from the snow water, I had to traverse some dead thickets of juniper and dwarf willows: here I caught a young fully-fledged fieldfare, and flushed a willow grouse with a brood of young. The old bird by its flight, &c., reminded me instantly of the red grouse (which I have so often shot on our moors), the only apparent difference being in the colour, which was lighter, especially in the wings. Here I may remark that the plumage in the red grouse is always lighter in the early part of the season, and that the dark chesnut-brown tint is not assumed until later in the autumn or towards winter. I managed to catch one of the young birds, and the exact similarity of colour between this and the young of the red grouse was at once apparent. After leaving the fields, and arriving at Christiana, I went to the Museum, in order to examine more closely the numerous and admirably-preserved adult specimens of the willow grouse belonging to this institution. On seeing these I was more fully convinced of the identity of the two species; and on mentioning my views to the learned Curator, Professor Essmark, he informed me that Mr. Gould (who saw these specimens some time ago) also inclined to think they were identical with the red grouse. Surely this is a matter of interest to those fond of Natural History, and one which I trust will be fully investigated. Should undoubted eggs of the willow grouse be in the possession of any gentleman in this country, who would closely compare them with eggs of the common grouse, this would, I think, throw some light on the subject, and perhaps clear up a matter of much interest. Having mentioned the Museum at Christiana, I cannot let this opportunity pass without recommending to the attention of those connected with similar institutions, the admirable contrivance adopted here for economising space in the arrangement of specimens, particularly those which are kept in jars and bottles in spirits. The contrivance consists of a number of vertical revolving pillars, with shelves around them at various distances, according to the height of the bottles. These pillars are arranged in rows in large glass cases. Professor Essmark, in a very kind manner, explained the construction, which I am sure is worthy of being adopted

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* If I mistake not, the red grouse to a slight extent follows the example of the willow grouse in assuming a winter garb of white; for who has not noticed the beautiful margin of white to the feathers of birds shot late in the season? This is more marked in very old male birds.

in all museums where economy of space is a desideratum. The plan is entirely the invention of the worthy Professor.—*G. Norman ; Hull, August* 9, 1858.

[There are three points of importance (two of them not noticed by Mr Norman), which require serious investigation before any conclusion on this interesting subject can be attained. *First*, the willow grouse turns white in winter in the same manner as the ptarmigan, whereas the red grouse, although inhabiting the same districts, exhibits no such tendency. *Secondly*, the wings of the willow grouse are *always* white, those of the red grouse *never*. *Thirdly*, the beak of the willow grouse is *much* stronger than that of the red grouse. These three are regarded as *specific* characters, whereas the different hue of plumage which Mr. Norman very rationally accounts for is not regarded as of specific importance.—*Edward Newman.*]

Occurrence of Baillon's Crake (Gallinula Baillonii) *near the Land's End.*—A mature specimen of this pretty little bird, in very perfect plumage, has, for the second time, turned up in this neighbourhood. It proved to be a male bird, and was captured in a narrow ravine running down to the sea. The blue about the head is almost uninterrupted, the olivaceous-brown, commencing in a narrow line on the top of the head, and dilating as it goes back to the occiput. Mr. Vingoe has preserved the specimen, and he told me that the irides, instead of being reddish brown, were bright scarlet. The beak of this bird is shorter than that of the little crake, and in fact, a far as I can observe, the bird is shorter altogether.—*Edward Hearle Rodd; Penzance, July* 9, 1858.

Beautiful Variety of the Garganey Teal.—On the 30th of July a pair of young Garganey ducks were killed at one shot on a marsh at Strumpshaw. Of these one exhibits the usual immature plumage of this species, whilst the other is a most delicate cream-colour all over, without spot or streak of any kind, the beak pink, and the legs very light in colour.—*H. Stevenson ; Norwich.*

Newt changing its Skin.—I happened to go to my aquarium yesterday just as one of the smooth newts was changing its skin. The operation was nearly completed, the skin being pushed down the body in a ring, by which the hinder legs were, to use an Irishism, handcuffed to the tail. The snout was principally used in shoving it down, and the tail was scarcely free when the animal seized the skin with its mouth, and in half-a-dozen gulps swallowed it. It is well known that the toad adopts this convenient method of disposing of its worn-out garment, but I do not remember to have seen the same practice recorded of the newt. The act of swallowing occupied nearly a minute, during which three filmy gloves (the integument of the paws) were projecting from the mouth. Although a tremendous yawn testified to the fatigue of the performance, the newt made no objection to concluding the meal with a small proportion of roast mutton.—*George Guyon; Richmond, Surrey, August* 12, 1858.

Occurrence of the Short Sun-fish on the Sussex Coast.—The 'Sussex Express' of July 24, states that on the Monday before, July 19, a short sun-fish was taken with a boat-hook while floating in Seaford Bay, off East Blatchington, by three brothers named

Green. The specimen measured 2 feet 10 inches long, and 3 feet 9¾ inches broad from points of fins; it weighed 77 lbs.—*Arthur Hussey; Rottingdean, Hants, July* 26, 1858.

Polyommatus Artaxerxes and P. Agestis.—In the 'Zoologist' (Zool. 6101) is a note from Mr. Logan, who, with some others of our northern entomologists, has come to the conclusion that P. Artaxerxes and P. Agestis are varieties of one and the same species, but upon what grounds I must say I am quite in the dark. Dr. Lowe read, some time back, a paper before the Royal Society of Edinburgh, to prove that P. Artaxerxes, P. Salmacis and P. Agestis, were one and the same. Mr. G. Wailes, of Newcastle, and Mr. Logan, are of the same opinion. It is strange that neither of these gentlemen has ever seen the larva of P. Agestis. From this I think they have decided too prematurely. Mr. Logan says, "I have never been able to induce any of our southern collectors to send me the larva of P. Agestis, which must be common and easily found;" this proves that he does not know its habits. Although the imago is common, the larva is not easily found. I discovered the larva of P. Agestis about eight years ago, and have taken it every year when on the Deal coast; why most easily found there, I will soon explain. I am surprised Mr. Logan has never sent to me for it. I have no hesitation in saying that it is quite different from the drawing of P. Artaxerxes he so kindly showed me when at Duddingstone last season. P. Agestis appears at a different time, is double brooded, and is different as to locality, food-plant and larva; its manner of changing to the pupa state is different. What can make it a variety of an insect that is not found in this country? The Helianthemum is common in many parts, but there is no P. Artaxerxes, and P. Agestis will not feed on it; so it cannot be from its rarity of the usual food-plant that P. Agestis takes to the Erodium. P. Agestis was a species, I think, before P. Artaxerxes was known. Why it is now to be a permanent variety I, for one, am at a loss to know. I have seen varieties of P. Agestis; these must now be called varieties of the permanent variety of P. Agestis: this will sound strange. The following is the history of P. Agestis, which I should like to see side by side with P. Artaxerxes, and it would then be seen that there are no two facts alike in their history:—The first brood comes out at the end of May; it is not so abundant as the August brood, and is much smaller. The larva is found in July, feeding on or under Erodium cicutarium, which grows here in large patches or beds, in many places apart from other herbage; and it is from this cause that the larvæ are so easily found. Having no legs, like many other larvæ they cannot feed on the tops of the plant. The common blue (*P. Alexis*) swarms in many places, but the larvæ are very seldom found, from a similar cause. On pulling aside the branches of the Erodium, the larvæ and pupæ are found on the sand beneath them; while the larvæ of P. Artaxerxes spin up on grass, dead stalks or the surface of stones; this, I think, is a reason quite sufficient to separate it from Agestis, and to establish each as a species.—*H. J. Harding;* 1, *York Street, Church Street, Shoreditch.*

[When my contributors differ from me on any point whereon I have expressed a decided opinion, it is, I think, not otherwise than courteous to support my own previously expressed views by any legitimate appeal to facts within my absolute knowledge. Now the identity of Agestis and Artaxerxes is *my* subject; I most unequivocally expressed my opinion as to this identity more than twenty-five years ago, in the

'Entomological Magazine,' and this opinion has many times been repeated; moreover, have *never* separated the two insects in the cabinet under my care. So that when an entomologist of Mr. Harding's experience and habits of constant observation comes into the field to break a lance with me on this subject, I experience

"That stern joy which warriors feel
In foemen worthy of their steel."

Now I am able to tell Mr. Harding that the apod larvæ feeding on Erodium cicutarium at Deal, which he has above described, and which have been sent also to Mr. Logan, who succeeded in rearing them, are those of a coleopterous insect, the beautiful Hypera fasciculata. PS.—Will Mr. Harding pardon me if I also inform him that it was Vanessa Atalanta, not Cynthia Cardui, that he found feeding on the pellitory? See 'Entomologist's Intelligencer' for July 17, No. 94, p. 125.—*Edward Newman.*]

Sound produced by the Larva of Acherontia Atropos.—Some few days since I became possessed of two specimens of the caterpillar of the death's-head moth (*A. Atropos*). Upon removing them one evening, for the purpose of supplying them with fresh food, they emitted a singular noise, continuous and rapid, which I can only liken to the sound produced by the sparks of an electrical machine. Every entomologist is aware of the peculiar noise emitted by the perfect insect (though as yet, I believe, the question has not been satisfactorily solved), and of the statement made by Mr. Raddon that the insect is able to produce the sound prior to its emerging from the pupa. I do not, however, remember ever having read an account of the instance I mention, and which can be confirmed by a gentleman present at the time. I should wish, therefore, to ascertain whether the fact has ever been recorded, and, if so, I should esteem it a favour if you would kindly furnish me with the authority. Does M. Goureau, in his 'Memoir on the Sounds of Insects' notice the fact?—*John Edmund Weatherhead; Curator, Town Museum, Leicester, July* 21, 1858.

Capture of P. Daplidice near Rottingdean.—On the 5th instant I had brought me a specimen of P. Daplidice. It had been taken on the same day near Rottingdean, a village near here, and was still alive when I had it. It is a female, and in very fair condition.—*John N. Winter;* 28, *Montpellier Road, Brighton, August* 9, 1858.

Pieris Daplidice.—I beg to record the capture, near here, of this insect, yesterday. There was a strong wind blowing at the time; and as I was walking along, it rose from the ground close to my feet to several feet above my head, when I distinctly saw the green under side; and shortly after its return to *terra firma*, it was pinned in my collecting-box. It may be well to add that there is no doubt respecting its identity, as experienced entomologists have seen it alive.—*J. Pratt;* 35, *Duke Street, Brighton, August* 6, 1858.—*From the 'Intelligencer.'*

Anthrocera Minos in the West of Scotland.—I have not observed that Anthrocera Minos has hitherto been taken in Scotland. I enclose one or two specimens captured on the 26th of last month on the side of the road between Oban and Dunstaffnage Castle, at the mouth of Loch Etive. I had no net, but managed to knock down eight or ten with my handkerchief and to spit them for the sake of the locality, with fine Highland pins.—*Professor Wyville Thomson;* 6, *University Terrace, Belfast, July* 3, 1858.—*Id.*

Cossus ligniperda at Sugar.—Within the last ten days I have taken no less than five specimens of C. ligniperda at sugar. They sit on the sugar very much in the same manner as a Noctua, but perhaps rather closer than the majority of Noctuæ. I think it is a fact beyond doubt that the Bombyces do occasionally come to sugar, and

although people look incredulous when you mention having taken one under those circumstances, and although they at once point out structural reasons why they should not be so taken, still there is no disputing the fact. May it not be just possible that although they cannot imbibe the sweets, the smell may prove as attractive to them as the taste is to the Noctuæ. I may mention also that many of the genus Lithosia come regularly to sweets; two or three instances have come under my own notice, and several others have been recorded. I should be glad to hear if any entomologist has met with other Bombyces under similar circumstances, and if so, trust that they will record it in the 'Intelligencer.'—*Robert McLachlan; Forest Hill, July* 1, 1858. —*Id.*

Two Pupæ in one Cocoon of the Silkworm.—One of my juvenile brothers, who keeps silkworms, was surprised yesterday by finding two pupæ in one cocoon. The cocoon is about twice the ordinary size, but of the same shape exactly as if made by one insect, and the two pupæ are quite loose inside without any separation. What seems rather remarkable is, that nearly the whole of the two threads of silk wound off as easily as if there had been but one. As I never heard of any similar case, this struck me as rather remarkable. Perhaps you may have met with something like it. I have the cocoon now, reduced to transparency by the removal of the silk, and should you think it sufficiently *outrá* I shall be happy to show it to you.—*T. Wildman; Solicitors' Office, Customs, E.C., July* 29, 1858.

Agrotis lucernea.—A single specimen of this insect was captured by myself, at Folkestone, about six weeks ago.—*Sidney Cooper; Stone Bridge, Tottenham, August* 2, 1858.

New Mode of capturing Nonagria geminipuncta.—Being occupied in collecting the larvæ and pupæ of N. Typhæ, the attention of myself and brother was drawn to the traces of larvæ on the stems of Arundo Phragmites. The larvæ, of which the figure in Humphrey and Westwood (N. geminipuncta) is pretty accurate, were in colour yellowish white, the head brownish black, a plate on the prothoracic and caudal segments without spots, but the meso- and metathorax had a ring of minute dark brown dots in pairs, the other segments with two dorsal and two lateral dots, and the spiracles black; from these dots arise small setæ. These larvæ did not confine themselves to one reed only, having in many cases attacked some half-dozen of the smaller plants before depositing themselves, full-fed, in the lower internodal spaces of the largest. Again, the window, which was never absent, was almost but not quite invariably above the entrance-hole, and beyond these two apertures was a wall of pith cemented together with silk,—a very necessary precaution, as the remainder of the reeds was frequently filled with water. We found as many as four pupæ in one internode, and sometimes six in an entire reed. The imago, which proved to be N. geminipuncta, emerges from the chrysalis between the hours of 6 and 9 P.M., being apparently influenced by the darkness, as an artificial twilight had the effect of bringing them out at mid-day. As the reeds frequently collapsed in drying, we were obliged in most cases to cut out the pupæ, which came out equally well. We have a few to spare.—*W. D. Crotch; Uphill House, Weston-super-Mare, August* 12, 1858.

Epione Advenaria.—A single male of this local insect was taken at night, at Warren Gore, Lewes, this summer, by Mr. John Porter.—*Edward Newman.*

Botys lancealis.—This has been an extraordinarily good season with us for Botys lancealis. Last year my brother, after exerting great diligence, thought himself very lucky in securing a dozen specimens. This year, however, in a path running through

a wood about two miles from Barnstaple, we observed B. lancealis in profusion. The path in question has a bank on either side, covered with wood, flowers and vegetation, and among the tall grass and flowers skirting the bottoms of these banks, B. lancealis kept house in goodly numbers. Like other pearls, B. lancealis is easily disturbed, and when on wing flies so slow as to be most easily netted. From the first week in June until the end of that month, this species continues out, and directly it is over it is succeeded by another little pearl (*Hypenodes albistrigalis*), which haunts the same path, and is to be disturbed from the same long grass which formed the lurking-place of B. lancealis. This little species is also abundant. Had we been inclined we might have pinned some hundreds of B. lancealis, but we contented ourselves with netting about fifty, to supply our correspondents, and to leave us a few duplicates for exchange. In this same path Erastria furcula was very abundant this season.—*Murray A. Mathews; Raleigh House, near Barnstaple.*

Larva of Chilo gigantellus.—This larva feeds in the stems of the reed. In order to move from one reed-stem to another, which when the plants are growing in water would seem a difficult proceeding, it bites off a piece of stem about its own length, spins it together at each end, and becomes for the time a case-bearer, till floating on the water it comes to another reed-stem, up which it crawls, fastens its canoe to it by one end, often perpendicularly, and bores into the interior. This account of its habits is given by Herr Moritz in Treitschke's work: the same observer also mentions that Chilo forficellus, which feeds in the stems of Poa aquatica, likewise makes a tubular case with a view to locomotion. I believe these case-bearing larvæ of the genus Chilo are occasionally mistaken for larvæ of the genus Coleophora.—*H. T. Stainton*; *July* 10, 1858.—*From the 'Intelligencer.'*

Coleophora Leucapennella.—Herr Mühlig has been so kind as to forward me some larvæ of this insect. They feed inside the capsules of Silene nutans (do any entomologists ever come across that plant in this country?) and when the capsule has been emptied of the seeds, the larva wishing to walk to another capsule, and not caring to be at the trouble of making a case, carries off the capsule bodily *cochlearum instar*, and bores into another capsule, till it has obtained as much food as it requires. Stranger still, the body of the larva having the capsule to occupy, swells out to most grotesque dimensions.—*Id.*

Xysmatodoma argentimaculella (*Tinea argentimaculella, Stainton's Insec. Brit. p.*36). —From the middle to the end of July I met with this brilliant species, and also bred it from cases on lichen growing on an old wall, nearly covered with herbage, at Bollington, near here: the habit and general appearance of the moths so resemble Melanella, which I have often bred, that they gave me the clew as to their whereabouts, or I might have been puzzled for years where they came from; the cases are exceedingly difficult to see, being precisely the same colour as the lichen they feed upon.—*R. S. Edleston; Bowdon, Cheshire, August* 2, 1858.

Captures near Bowdon.—During the present month I have captured the following species:—Nemeophila Plantaginis, Anaitis imbutaria, Cœnonympha Davus, Acidalia inornaria, A. nitidaria, A. obsoletaria, Hyria auroraria, Pyralis glaucinalis, Nephopteryx abietella, Cryptoblabes bistriga, Amphysa Gerningiana, Tortrix viburnana, Sericoris decrepitana, Retinia Buoliana, R. pinicolana, R. pinivorana, Stigmonota coniferana, Crambus falsellus, Macaria lituraria.—*Id.; July* 12, 1858.

Larvæ of Cemiostoma lotella.— Mr. Wilkinson, of Scarborough, has sent me a magnificent supply of the larvæ of this little gem. The mine is at first a round gray

blotch on the upper side of the leaf, the egg-shell being a very conspicuous object on the centre of the blotch; the mine afterwards is extended much beyond the gray central portion, the outer area being pale green. It is not a little singular that Nepticula Septembrella and Cemiostoma lustratella feed on Hypericum, and the mines are often mistaken by the uninitiated; and that two species, so to speak, perfectly parallel, Nepticula cryptella and Cemiostoma lotella, feed on the Lotus; and their mines might readily be confounded by one not personally acquainted with them. The leaves sent appear to be Lotus major, not corniculatus, but probably it will feed on both species.—*H. T. Stainton; July* 5, 1858.—*From the 'Intelligencer.'*

A new Mine on Centaurea.—The day before yesterday I made a curious discovery: I found, at the edge of a wood, the leaves of Centaurea jacea tenanted by a mining larva: the larva is very slender, of a yellowish green, spotted with black, with head and second segment pale brownish: the mine radiates in different directions, like those of Druriella and Heydeniella. The larva abides over the midrib, beneath the loosened skin, and only sallies forth into the mine for the purpose of eating. I have only found a few, and am very curious to know what they will produce.—*Professor Frey, Zurich; June* 23, 1858.—*Id.*

The Centaurea jacea Miner.—I have no doubt that by this time Professor Frey is as much astonished as myself at the change which has come over the appearance of the caterpillar. The yellowish green look which they had is now gone, and they may fairly rank amongst the prettiest of the micro larvæ. They are now of a pale yellow colour with a dorsal line, and two others on each side of it, bright pink. The lines are slightly interrupted at the junction of the segments. As they approach the antepenultimate segment these lines become united, so that the terminal segments are of a uniform pink colour. The head and corselet still retain their pale brown appearance, and the posterior edge of the corselet is now bordered by a darker line. The two rows of dark spots also remain on each segment, four of which posteriorly and two anteriorly are the most conspicuous, and from each of these starts a single hair. I am half inclined, despite their very gay appearance, to believe them to be the larvæ of one of the Depressariæ.—*John Scott; Southfield Villas, July* 17, 1858. [On the contrary, we believe they will produce a new species of Cosmopteryx.—*H. T. Stainton.*] —*Id.*

[Botanists in this country have invariably assigned the name of Centaurea jacea to the very common Centaurea nigra. Are the two species thus named on the Continent really distinct? If not, search the common knob-weed (*C. nigra*) for this miner.—*E. N.*]

Abundance of Psyche nitidella.—I had been sugaring all night at Wickham, and in the morning searched the fence with my usual success,—which is none,—and, feeling sleepy, lay down on the bank by the fence and dozed a little: presently I was disturbed by something fluttering in my face, and opening my eyes recognised Psyche nitidella: turning for my net to catch him I saw that there was a little swarm of them flying about me, and as fast as I could take them they continued to come round me as long as I continued lying on the ground; when I got up, thinking to take them better, their interest in me seemed to cease, and I could take but few, and by six o'clock there was not a specimen to be seen; but I had secured about forty: it was about five o'clock when I first discovered them. I cannot understand what attracted them; there did not seem to be any females about, at least I could see none, nor any cases, and the specimens I have bred do not seem to care much about the females.

After I got up they did not swarm any longer about the spot where I had been lying: they flew so close about me that I could hardly net them without hitting my face and head, and when I had boxed some of them in tin boxes, and laid them on the ground, other specimens flew about them, and seemed to be trying to get into the boxes.—*C. G. Barrett*, 37, *Park Street, Mile End; June* 26, 1858.—*Id.*

Phibalapteryx fluviata and P. gemmaria: are they distinct?—I took, on the 9th inst., a male specimen of this insect: it therefore appears to be double-brooded as well as gemmaria. It seems very peculiar that all the specimens of fluviata that have been taken in England, as far as I am aware, are males, and all the specimens of gemmaria females. I should be glad to hear if any one has met with female specimens of fluviata or male specimens of gemmaria. Or are the two species only one, and the difference in the markings only sexual?—*G. Harding, jun., Stapleton, near Bristol; June* 28, 1858.—*Id.*

[The occurrence of these two rare insects in company near London, and the examination of many recent London specimens, the males being invariably fluviata and the females gemmaria, led me to suspect the identity of the two some weeks since. —*E. N.*]

Retrospective Criticism on Dr. Gray's view of the Cause of the Cells of the Honey Bee being of an hexagonal form. — In the Proceedings of the Entomological Society (Zool. 6189) there is a report of a discussion on the shape of the cells of the bee, in which the following sentence occurs:—" Dr. Gray contended that the hexagonal form was undoubtedly the result of lateral pressure: if cylinders composed of any yielding substance (vermicelli for instance) were placed side by side and subjected to such pressure, they were invariably forced into the hexagonal form. He considered the attempt made by natural theologians, to prove that the formation of a hexagonal rather than a cylindrical cell indicated the possession of a greater degree of Divine wisdom bestowed upon the insect, was the greatest piece of humbug they had ever brought forward." I leave the matter of fact to those who have studied the subject, merely remarking that the position seems to me perfectly untenable; but the closing sentence broaches a much wider and more important subject. I have always understood and believed that all natural theologians agreed in describing instinct to be that power imparted to all animals by their Creator, by which they do, without thought or reasoning, everything which in the ordinary course of nature they have to do, in the best possible manner; and that all naturalists are equally agreed that this power is evident in the actions of every wild animal and insect. If, then, the hexagonal is the best form for the cells of the bee, that they should make them of that form is just what we might have expected from the analogy of all animated nature. Dr. Gray does not say where the lateral pressure comes from; but if it is given by the bees themselves, or arises from some cause which might have been calculated upon, the question of instinct remains untouched; but if the pressure is accidental, it seems to me that the supposition that bees make cells of one form, and then leave them to be changed into another and a better one, by something which may or may not happen, is quite inadmissible.—*Thomas Boyd;* 17, *Clapton Square, August* 6, 1858.

Beetles at Home.—In the front of this house, so graphically described in Newman's 'Insect Hunters,' there is a small bricked area, and the aspect being north it is usually somewhat damp, and the resort of sundry Onisci. Here they might lead quiet and sequestered lives as becomes such retiring animals, but it is no happy valley for them, for by accident or design certain filibustering Carabidæ drop down

into it, and, relinquishing their usual nocturnal habits, employ themselves by making murderous daylight attacks upon the peaceful Onisci. In vain they roll themselves into balls; their assailants find a salient point, and, working away with their powerful mandibles, soon leave nothing but a shell. These beetles, however, do not devote exclusive attention to the Onisci, for if a caterpillar unluckily falls from the birch tree above, they devour it entirely; any poor powerless beetle that comes in their way is speedily added to the list of victims; even those hardest of all Coleoptera—the Curculionidæ—I find deprived of legs and antennæ, and eventually I believe the marauders attack each other, for their mutilated skeletons are scattered in all directions, showing the truth of the old adage, that "two of a trade never agree." The species I find are Carabus violaceus, Pterostichus madidus and P. melanarius, and sometimes a member of another amiable family, Ocypus olens, drops in to assist at the revels.—*J. W. Douglas*; 6, *Kingswood Place, Lee, July* 29, 1858.—*From the* '*Intelligencer.*'

Notes and Observations on the Genus Necrophorus.

By Frederick Smith, Esq.

When I was a very young entomologist, I read with indescribable satisfaction the graphic account of the habits of the "burying-beetle" by Rusticus, in the 'Entomological Magazine:' these insects have been favourites with me ever since. There are certain genera and species of insects for which one has a particular regard, arising entirely from the simple circumstance of our having become intimate with their habits through the medium of some master mind, who has correctly pourtrayed them. The history above referred to is of course only the habit of the insect under such circumstances as described, or as they would be when dealing with similar "small deer," as a frog, a mole, a mouse, or any small bird. I will state my own experience of collecting these insects under a dead sea-gull: I found the bird dead on the shore, and placed it on a sand-bank which had a south-west aspect; this was towards evening on a hot day in the month of August. The following morning I captured, beneath the bird, five beetles (four males and one female) of Necrophorus Ruspator, and one male and one female of N. Vestigator; the next morning I took two of N. Humator and five of N. Vestigator; on a third visit the gull yielded two males of N .Vespillo, four of N. Ruspator, and three of N. Vestigator, the number of the sexes being very unequally divided, the specimens of Ruspator being all males. By the time I had secured the above number of specimens,—which, together with hosts of flies, Silphidæ

and Staphylinidæ, had deposited eggs, which had hatched and their maggots were feeding on the carcass,—it had become too putrid any longer to attract the Necrophori. I had thus obtained twenty-three individuals of different species of Necrophorus, under a single bird. A bird of the size of a sea gull is never buried, as would be the case with a bullfinch or any small bird: the larvæ of Necrophorus, when full fed, leave the dead carcass and bury themselves in the earth.

Following up the same system, with other baits of a similar kind, enabled me to obtain fifty-seven burying-beetles, of species as follows:—

Necrophorus	Vestigator	35
„	Ruspator	10
„	Humator	7
„	Vespillo	5

It will be seen from this enumeration that of the rarest of our red and black species I obtained the greatest number. The following is the nomenclature adopted; it may probably not prove eventually to be correct, but it is in accordance with named specimens from Germany, in the collection of the British Museum:—

1. Necrophorus Vestigator, *Herbst.*, *Illig. Mag.*
   Sepultor, *Gyll.*, *Steph*
2. Necrophorus Ruspator, *Erichs.*
   Vestigator, *Steph.*
3. Necrophorus Humator, *Oliv.*, *Steph.*, &c.
4. Necrophorus Vespillo, *Linn.*, *Steph.*, &c.

I will now make a few observations on the species of the genus, and point out such localities as have produced them of my own knowledge. It is quite evident to me that the species, at least some of them, are local, for although I have never lost an opportunity of laying traps or baits when visiting any new locality, I have, during the present season, for the first time, captured N. Vestigator.

Necrophorus germanicus. In Stephens' 'Manual' three localities are given for this insect; the only one where it has been captured, of my own knowledge, is Hastings, where my friend, the late Mr. Heales, himself took a specimen about twelve years ago.

Necrophorus Humator. Apparently generally distributed; I have

always found it attracted by any large animal or bird, sometimes in great numbers.

Necrophorus Vestigator. Stephens gives the London district, but although I have searched under birds, moles, &c., in many parts of the suburbs of the metropolis, I never met with it, nor do I remember any collector of my acquaintance who has been more fortunate; the only locality with which I am acquainted is the neighbourhood of Lowestoft, in Suffolk.

Necrophorus Fossor, Erichs. Of this species I obtained six examples under dead adders, at Southend, in the month of August; I never found it elsewhere, but Stephens gives the London district and other localities, showing it to be very widely distributed; it must be much less abundant than most of the species, or I think I must have either met with it or seen it in other collections more frequently. This is the N. interruptus of Stephens.

Necrophorus Ruspator. Stephens says, "Generally distributed:" as far as my experience has enabled me to judge, it is far more numerous in some situations than in others: I have only once or twice taken it near London, whereas about Southend, Deal and Lowestoft, it is plentiful.

Necrophorus Mortuorum. This is certainly widely distributed, although I did not find it in Suffolk.

Necrophorus Vespillo. Generally distributed.

Necrophorus Obrutor, Erichs. Given in Stephens' 'Manual' as British; I have not seen any British example: said to be taken at Hertford.

FREDERICK SMITH.

Megachile centuncularis.—At the back of this house two rose trees grow up the wall, one of which is selected by this bee for her operations, the leaves being larger and thinner than those of the other tree, which are never touched by her. She comes in a direct line over the tall trees at the bottom of the garden, and soon selects a leaf. On this she settles, generally, but not always, with her head to the footstalk, and taking the leaf between her legs, rapidly cuts out a piece in the manner often described, sometimes circular, but often oval, her operations being no doubt guided by the requirements of her nest, the oval pieces being for the outside walls, and the circular ones for the partitions. It has been said that she poises herself on her wings in order to avoid tearing the leaf or to hinder her and the piece from falling to the ground when the latter is cut off, but I narrowly watched this one, and in every instance her wings were motionless. As the cutting proceeded, she curled the piece under her, and when the piece was separated both she and it fell downwards for a short

distance; then, and not till then, did she open her wings to arrest the downward tendency, and soon recovering herself, mounted upwards with her burden. Sometimes, but not always, she rested on the palings close by, and then, rising upwards, proceeded in a direct line to her nest.—*J. W. Douglas;* 6, *Kingswood Place, Lee, July* 30, 1858.—*From the 'Intelligencer.'*

Bembidium laterale in the Isle of Wight.—A lepidopterological friend at Bembridge has met with Bembidium (Cillenum) laterale in some abundance running about on the wet sand there, in which it makes little burrows. The Isle of Wight is, I believe, a new locality for the species, although it is well known to occur at Portland. —*George Guyon; Richmond, Surrey, August* 13, 1858.

Capture of Chlænius Schrankii in the Isle of Wight.—On the 31st of July, while looking for insects at Luccombe, I had the good fortune to find nine specimens of Chlænius Schrankii, apparently not long hatched: they were running over the damp green sand half way down the cliff. The day was particularly fine, and heavy rains had recently fallen. On a subsequent visit I could obtain only one; the ground on which I had previously found it had become perfectly dry. It will be remembered that Mr. Bates took one at Luccombe last year.—*George Lewis;* 14, *Woodlands Terrace, Blackheath, August* 21, 1858.

The Silkworm.—The following facts, just laid before the Academy of Sciences by MM. Decaisne, Peligot and de Quatrefages, members of the committee appointed to investigate the cause of the diseases of the silkworm and seek a remedy for it, are not without interest. These gentlemen, having visited various parts of France, found the mulberry leaves everywhere in excellent condition, so that there is no foundation in the opinion which attributes the disease to bad food. Of all the diseases to which the silkworm is subject, that most frequently met with is known by the name of *pattes noires* or *poivré* in France; M. de Quatrefages proposes to call it the *maladie de la tache*, from the spots which appear on the worm when attacked with it. These spots are often invisible to the naked eye, and can only be perceived with the aid of a magnifying glass; and this circumstance explains why the malady, especially during the present year, escaped the observation of silk-growers in the majority of cases until five or six days after the worm had cast its fourth skin. The spots exist in all the tissues and organs of the worm, and in its subsequent stages of a chrysalis and moth. In the latter the spots destroy the antennæ, the legs, or a portion of the wings. In the beginning the spots appear under the form of a yellowish matter pervading the whole system; this matter gradually becomes darker, and is then concentrated into a number of tubercles, which are the spots in question. That such a diseased state should exercise an influence on the quality of the eggs is not surprising, but to what extent can only be determined by future experience. An infected silkworm may spin its cocoon when the disease is not too far gone, but the insect generally dies, and the body, instead of putrefying, becomes dry and brittle. M. de Quatrefages has tried several methods of cure; first, the hygienic process, which consists in rearing the worms in open sheds instead of close rooms. The leaves of the wild mulberry, not stripped from the branches, he has found very efficacious. He strongly recommends silk-growers to rear small lots of worms apart from the others, solely for the purpose

of propagating the species. But, besides these precautionary measures partly recommended by others, he has had recourse to new remedies not hitherto recommended, and has endeavoured to administer various medicines to the worms. From his experiments it appears that the silkworm does not refuse to eat the leaves of the mulberry sprinkled with Peruvian bark, gentian, valerian, mustard, &c., and the two latter powders especially would seem to produce good effects. But scraped sugar appears for the present to be preferable to all other remedies. The worms eat the leaves sprinkled with sugar with extraordinary relish, and the experiments with this substance were accordingly repeated on a larger scale in the estalishment of M. Augliviel, in the department of the Gard, where one of the silk sheds, fitted up for twenty-seven trays, was reduced by disease to four. The worms of these were transferred to another shed, and divided into four lots; the first was fed in the common way, the second with moistened leaves, the third with sugared leaves, and the fourth was subject to a rigorous abstention from food for seventy-five hours, and then fed chiefly with sugared leaves. At the end of twenty-four hours several worms of the latter lot began to spin, and made several small and imperfect cocoons on the tray; the other worms began to shrivel up and diminish in size, but on receiving the sugared leaves they speedily rallied, and many of them spun their cocoons. The worms fed with moistened leaves fared very badly, and very few of them spun cocoons. Those fed in the common way presented nothing remarkable, and yielded a certain quantity of cocoons; but those fed with sugared leaves thrived well and spun their cocoons sooner than the others. The quantities of silk yielded by these four lots were respectively:—1st lot, 210 grammes; 2nd lot, nought; 3rd lot, 392 grammes, and of a superior quality; 4th lot, 152 grammes. Now, when it is considered that such a result was obtained from the use of sugar on worms, the state of which was hopeless, it may reasonably be concluded that its effect will be much more satisfactory in less desperate cases. At all events, one great fact has been put beyond a doubt—viz., that medicine may be administered to silkworms in the same way as it is administered to cattle and poultry.

Proceedings of Societies.

Entomological Society.

August 2, 1858.—J. O. Westwood, Esq., V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'The Natural History Review' Vol. v. No. 3; presented by the Dublin University Zoological Association. 'The Zoologist' for August; by the Editor. 'A Manual of British Butterflies and Moths,' No. 19; 'The Entomologist's Weekly Intelligencer,' Nos. 93—96; by H. T. Stainton, Esq. 'The Literary Gazette' for July; by the Editor. 'The Journal of the Society of Arts' for July; by the Editor. Four specimens of Laverva phragmitella; by A. F. Sealy, Esq.

Election of a Member.

George Fenning, Esq., of Lloyd's, London, was balloted for and elected a Member of the Society.

Exhibitions.

Mr. Knaggs exhibited a box of beautiful Lepidoptera and other orders of insects from Demerara.

Mr. Waring exhibited a fine male specimen of Notodonta bicolora, a species hitherto unrecorded as British, taken by Mr. Bouchard, in July last, near Killarney.

Mr. Hunter exhibited fine specimens of Trochilium Chrysidiformis and Spilodes palealis, taken near Folkestone.

Dr. Wallace exhibited the following insects, taken in the Isle of Wight this season, *viz.*, Micra ostrina (two specimens), a species hitherto recorded as British on the authority of a single example, taken many years since, by the late Captain Blomer, near Bideford; fine specimens of Spilodes silacealis; a Nola, apparently distinct from the known British species; and a fine series (including both sexes) of Phibalapteryx gemmaria, amongst which, he observed, were specimens similar to those recently recorded in this country as P. fluviata.

Mr. Westwood read a letter from Herr Nietner, received by Mr. Spence, recording the discovery, in Ceylon, of a Strepsipterous insect, parasitic on an ant. Mr. Westwood exhibited drawings, and read a description of the species, drawn up from the mutilated examples which accompanied Herr Nietner's letter, proposing for it the name of Myrmecolax Nietneri.

Mr. Walker read a paper on 'Undescribed Neuroptera in the Collection of W. W. Saunders, Esq.'—*E. S.*

A few Remarks on the Fauna of Amoy.

By Robert Swinhoe, Esq., of H.B.M. Consulate, Amoy.*

I would beg to offer for your consideration a few remarks on the Fauna of the island on which our lot is at present cast; for though Zoology is not much studied as a science, yet we are often willing to learn of the peculiarities and economy of creatures that breathe the same air as ourselves, and are dependent on the same natural resources for existence.

Who has not wondered at the bare hills of Amoy, at the first glimpse he obtains on entering the harbour, and, seeing the great boulders of rock rise one above the other in endless confusion, thought to himself with a shudder, Can animal life be there? But

* Read before the Literary and Scientific Society of Amoy, November 17, 1857, and communicated by H. Stevenson, Esq.

though animal life is there to a small extent, it is to the plains, which are inhabited and cultivated with such care by the natives, that we must look for most that will interest us in our science.

The wily fox is the first animal which we have to consider, for, low as he stands in the natural series of Mammals, he is here prominent as the largest of the Carnivora we possess; that is to say, if we lay aside the claims of the half-starved Chinese cur, to which the term "wild" might almost in some instances be appropriately applied, and the vague rumours of the migration of tigers from the mainland. The fox, the Hoo-lee of the Court dialect, and the Hill-dog of the Amoy, is found, but not very abundantly, in the vicinity of most of the temples, and I have myself watched it more more than once stealing along noiselessly, with its conspicuous bushy tail hung down, just as the setting sun was withdrawing its last rosy tints from the floating clouds overhead. The low cunning of this animal is too well known amongst us; but I have never heard of any of its signal feats in this part of the world, with the exception of the occasional abduction of a fowl from the villagers, in defiance of the vigilance of the noisy watch-cur. I have had the good fortune to obtain a cub and a full-grown female of this species, and I think I can safely pronounce it to be the same as the European Vulpes vulgaris.

The greatest devastator among the poultry of the poor is an animal belonging to the weasel family (Mustelidæ), and, though generally distributed, is very rarely seen. It measures about a foot and a half in length, has a buff-coloured fur, with a black muzzle, and is the Hwang-shoo-lang of the Pun-ts'aou, and the Chiah-ch'oo (tawny rat) of Amoy men. The havoc it commits amongst domestic fowls is well compensated for by its predilection for rats, which vermin it is said to destroy in large numbers. In the occasional high tides that wash over the bund into the merchants' godowns here, among the numbers of rats that are seen struggling near the surface of the water, driven out of house and home, it is not unusual to see a few of these weasels wriggling their long bodies like snakes to some place of shelter.

Before leaving the Carnaria it would be as well to mention a curious animal that was brought alive to me by a native, and which I kept some months in confinement. It evidently belonged to the civet family (Viverridæ), measured in length one foot and a half, having rather long fur of a dingy brown colour, and a black head with a white line down the snout; the tail was tipped with white. At first I was doubtful whether this might not be some animal brought up by a Singapore junk, and not indigenous to China; but all doubt was

removed on that score by my subsequently receiving a skin from Tungan, as a present, from a Chinese friend. It was described in his letter as the Yuh-meen-maou, or gem-faced cat, and he regretted not having been able to send the body in the skin, as this animal is considered quite an epicure's dish. It is described in the Pun-ts'aou under the name Hwan.

We have also heard certain stories about the sea-otter that is occasionally seen prowling about on the Six Islands, seeking his finny prey at the dead hour of night, and avoiding the light of day; for soon as morning breaks—

> "Consueta petens e fluctibus antra,
> Ibat."

I have at low tide often traced footprints on the sand of some animal into several caves in Koo-lang-soo, and by following up the track have eventually come on small heaps of fish-bones, but the animal that deposits them I have never had a glimpse of.

In the Rodentia we are confined to that horrid group of vermin, rats, there not being sufficient shelter for hares, nor wood enough for squirrels to play their gambols in. The brown rat (*Mus decumanus*) is of course found here, as indeed it is in all parts of the world wheresoever commerce has carried her deeply-laden vessels. M. Cuvier says that "this rat originally came from Persia, where it lives in burrows; and it was not until 1727 that, after an earthquake, it arrived at Astracan, by swimming across the Volga. It did not pass into Europe until the eighteenth century, and is now common in all large cities throughout the world." The musk rat (*Sorex Myosurus*), with a leaden black skin as soft as velvet, Chî-ch'oó (money rat), a pointed snout and diminutive eyes, is also a common species, but it contents itself with the kitchen and lower parts of a house, and never ventures as high as the upper story. It occurs plentifully in sewers and damp places, and in Chinese dwellings, whence you often hear its sharp shrill cry, which, the Chinese say, sounds not unlike the jingling of money. It is remarkable for its strong musky odour, with which it impregnates almost everything it touches or runs over. True mice I have never seen here, and indeed where their larger brethren are so plentiful I should almost doubt their existence. A water vole (Arvicola) is found in the vicinity of ponds.

The next quadruped, the only representative we possess of the order Edentata, is far the most interesting, on account of the numereous peculiarities both its form and habits present. It is the scaly

ant-eater or pangolin (Manis of Linnæus), "having no teeth, an extensile tongue, and subsisting on ants and termites; its body, limbs and tail are covered with large, trenchant, imbricated scales, which it elevates in rolling itself into a ball, when wishing to defend itself against an enemy; all its feet have five toes." Such is Cuvier's description of the genus. Ours is a small species (probably Manis brachyurus), measuring *in toto* only two feet and three inches, of which the tail takes one foot. Its gait is most peculiar, — with the body bent in a bow, and the head and tail downwards, as it runs along on the sides of its fore feet. The moment it is touched or molested the head and tail are dragged under the belly, and the animal assumes the appearance of a ball. A live individual was brought to me by a Chinaman with a string tied round one of its hind legs; and to show me the immense muscular strength of the animal, he stood upon its back, and the creature actually raised itself and advanced a few steps. I kept it for some weeks, though when the string was removed from its leg I was at a loss what to do with it, for no box was strong enough to stand its burrowing propensity. At last I inserted it into an overland tin case, and outstood the grating noise produced by the scratching of his long claws on the tin. But it did not hold him long, for though the box was much too high, I thought, for it ever to attempt its escape by forcing the lid, yet this wonderful creature, by supporting itself on the end of its tail, and making use of its claws, managed to get out of the box. I captured him again, tying a piece of whip-cord round his hind leg, it being useless to attempt to bind his retractile neck, secured him under a ladder, with hard tiles to frolic on, and a snug corner to retire into at pleasure. Next morning, however, on paying him a visit, I found he had not contented himself with the snug corner, but had raised one of the tiles, and dragged himself into the earth to the full extent of his string. Without a spade it was impossible to dislodge him, so I let him be; and there he remained for several days without a single morsel of food. At last he left his hiding-place, a good deal thinner, but not much reduced in bodily strength; for that same day with an effort he released his body, and left his bleeding leg behind dangling to the string. The bone of the femur remained on the animal whole, but the flesh had been torn away. He lived for a day or two after this catastrophe, not appearing to pay much attention to his wound, which was fast festering. Strength at last failed him, and he died. The Chinese call this animal, in the Mandarin, the Chuen-shan-kia, or hill burrower, and in the Amoy the Lâ-leé, whence I suppose is

derived the expression La-lee-t'aôu, applied to a scabby head, in allusion to the bare hairless state of the pangolin's back. Many strange stories are told about this creature by the natives; among the strangest of which is the cunning mode employed in procuring a meal. The artful pangolin, when suffering from the pangs of hunger, rolls himself up, and, erecting his scales, lays bare the naked flesh beneath; in this position he lies for some time, until, attracted by the savory smell of flesh, thousands of mosquitoes swarm on his back to devour; the scales are then simultaneously compressed, and a plentiful meal is shaken out from the fold of his coat of mail, to be relished at leisure by his long tongue. Large prices are given by the native doctors for this animal, as its flesh and bones are employed for various medicinal purposes; and one of its scales, fastened to the end of a stick, is sold as a safe instrument to be used in scratching, without fear of producing ulcers on the skin. So much, then, for the La-lee, on which I have dwelt longer than I should; but, considering its numerous peculiarities, I thought I was justified in saying what little I knew.

Dismissing, then, the Cheiroptera of the Carnaria, with a notice that several species of the genus Vespertilio exist under the venetians and eaves of most of our houses, and may be seen of an evening performing "on giddy wing their gambols round the brook, the tree;" and also the Cetacea, the Phocænæ or porpoises of which order are well known to us even in the harbour, where at times they may be seen showing their round white backs in a line, and then disappearing, to be seen again at a further distance; — let us now turn to the Aves, at which class we must take a much more general glance, as their numbers are much greater than the Mammals; for there are certain spots on the earth's surface where the latter are seldom, if ever, seen; but, possessed of such various locomotive powers, the former are found in all parts of the globe. We commence, then, with the Raptores. Of the true Falconidæ, the species indigenous to Amoy is the Falco tinnunculoides, also found in Europe. The peregrine falcon (*Falco peregrinus*) is a straggling visitor, but a pair built their eyrie last year on the high hill of Nan-tai-woo (on the summit of which stands the pagoda), and some Chinese, who had robbed the nest, exposed the young birds (little balls of white down, with long yellow claws and noble black eyes) in the market for sale as young kites. I readily purchased them, and kept them in confinement for some time, and had the pleasure of watching the gradual casting off of the white down, and development of feathers. Their erect posture,

piercing glance, and superior size,— who that has once seen can ever mistake the peregrine?

A species of sparrowhawk (*Accipiter*), differing principally from that bird in England in having white instead of red axillary coverts, makes an occasional tour in the vicinity. There is also a buzzard (*Buteo*), and the hen harrier (*Circus cyaneus*) of Britain is seen not unfrequently in the early winter.

The kite, or Bah-heò, pronounced Nai-heò in the Chang-chow district (*Milvus Govinda*), the scavenger of the harbour, comes next. At all hours of the day he may be seen floating in numbers over the tall masts of the ships, uttering his well-known scream. Some offal on the surface of the water catches his eye; he descends and bears it away, perhaps pursued by several others, to some favourite rock, where, having driven off his pursuers, he quietly tears and swallows his morsel. An arrant coward, too, is this self-same kite. A crow or a magpie is often seen to attack him when he approaches the vicinity of their nests, and the ignoble bird of prey retreats at once, with piteous cries, at every attack of his assailant offering his hooked claws, but making no further resistance. Among themselves in the breeding-season they fight a good deal, but never come to an earnest set-to; it is always pounce, offer claws, scream, and fly away. Once, by some mismanagement in this mode of fighting, I saw a pair hook claws, and at claws' length spin round and round, not being able to extricate themselves till they reached the ground. They build in great numbers on the precipitate sides of the Pagoda Island, and one pair had the temerity to nestle on the top of the ruins of the half-fallen pagoda, but at the same time had the good sense to place their nest on the side least exposed. I discovered no less than six nests in an evening's stroll on the island; they were built of twigs, roots, pieces of rag or paper, or in fact any available rubbish, sometimes lined with a few feathers. Their eggs are nearly round, as big as a good-sized hen's egg, and blotched with olive-brown. In an evening at sunset I have counted as many as sixty kites, soaring at different heights over that island.

An osprey (*Pandion*) is sometimes seen even in the harbour, but little is known of him. I have seen him strike a fish close under the bows of a vessel, and bear it away in triumph.

The great owl (*Bubo maximus*), Am-kong-cheáou, I have seen twice, but have been assured by the priest of the Nam-p'o-t'o temple, that in rainy seasons he has shot (he sports a foreign gun) several specimens. I reared a young one, and kept him for more than two years; by

some accident in the beginning of his career he had one of his eyes knocked out, when the other orb seemed to increase in size and lustre, and make up somewhat for the lost eye. The iris was of a dark golden yellow; but his great cat-like head, with long feathery horns, which he always erected when irritated,—his loud snap of the bill and hiss of alarm, and flap of his expansive wings, used to be the admiration of all who saw him. In very hot weather he used to shake the skin of his throat with mouth open, in the same manner as turkeys do.

A sparrow owl (*Nyctipetes*, Swain.), and a small tawny Scops owl (probably Scops rufescens of Horsfield), are seen occasionally in winter.

We will pass more rapidly now through the next and most extensive order, that of the perchers (Insessores), and I will only make slight mention of a few of the species that are strictly indigenous to Amoy. At their head stands the large butcher bird, or shrike (*Lanius*, Schach), nearly always to be met with in the valleys, uttering his discordant cries. It is the Pe-ló of the natives.

Among the Merulidæ, or thrushes, the blackbird and rock thrush (*Petrocincla violacea*) are always with us, the former enlivening our gardens by his rich full notes, and the latter enchanting the lonely wanderer among the bleak hills with his wild minstrelsy, as he sings from the summit of a monstrous boulder, or springs lightly into the air, trolling forth his merry roundelay. It may be mentioned that the blackbird here, though very similar, is yet not the same as our blackbird at home; he differs not only in being of greater size, and in the colouring of the female, but also in his call-note. The rock thrush and blackbird are taken by the Chinese for one and the same, and are called Ok'ee, though one is blue and red, and the other black.

The most familiar and perhaps best known is the magpie robin (*Gryllivora*), a small bird of the pied plumage of a magpie, with the habits and peculiarities of a robin. Its song, poured out at early morn or sunset from the roof-tops of our houses, is occasionally pretty, but abounding in harsh and jarring notes. Like the redbreast at home, it is very quarrelsome, and sings in defiance when engaged in duels with others of its tribe; but few engagements prove mortal, except in the pairing season, when it is not uncommon to find the defeated gallants skulking about, and seeking for holes that may suffice them at once for deathbed and coffin. Its native name is Sze-he, which means "resembling the magpie," and it is here vulgarly called Chúy-k'am-ch'e.

The most diminutive of all stands next, the little tailor bird (*Orthotomus*), remarkable for its long pointed bill, which serves as a needle in sewing leaves together round its nest; the under side of a long leaf of the Alpinia nutans is often chosen, the edges of which are drawn together by thread made of spider's web and fibres. The prettiest construction of the kind I have seen was a nest flanked in by three orange-leaves, and placed at the extremity of the bough of an orange tree. This bird is called Mang-tang-á in the vernacular.

A genus of long-tailed birds, closely allied to the last, is found wherever bushes abound, the longtails (or Priniæ). Their song is sweet, but never varied.

The Zosterops, white or mealy eye, Fun-yen and Chi^{n}-si-á, little green and yellow birds, with a peculiar ring of white feathers round the eye; and a species of tomtit (*Parus*) may be met with all the year through.

Time would not suffice were I to give separate remarks on each indigenous species. I must not, however, pass over a very singular bird of the tribe Tenuirostres, by no means uncommon in Amoy, and which cannot help attracting notice by its gay colours and peculiar form; I mean the hoopoe (*Upupa Epops* of Linneus), also found in Europe, and a rare straggler in Great Britain. It is a bird of a buff-fawn colour, striped transversely with black, and adorned with a beautiful crest of long lax feathers, banded alternately with red and black, which he is capable of raising or depressing at pleasure. The awkward gait of the bird; its occasional tapping on the ground with its long bill, as if with a walking-stick; and its singular habit of bowing when disturbed, would of themselves make the creature an object of interest; but what is most peculiar is its cry of *hoo-poo-poo* (whence its name), produced by drawing the air into the trachea, which puffs out on each side of his neck, and forcing it out again by striking the point of his bill against the ground, each stroke producing a separate and distinct note. It is looked upon with some aversion by the Chinese, on account of its often selecting dilapidated coffins to nestle in, and is nicknamed by them the coffin-bird. I have found the nest in an exposed coffin, as also in the city wall. The young are very timid, and make a strange hissing noise when crying for food.

The Ardeadæ, or herons, as might be expected from the large tracts of paddy fields, abound in their species, prominent among which stands the heron of Great Britain (*Ardea cinerea*), also found here. Flocks of the beautiful white egret, or paddy bird, as they are

familiarly known to us (*Herodias Garzetta*), often attract our attention as they wing their way slowly through the obscure blue of a summer twilight, from the fields where they have been feeding, to their selected nest-trees, on which they settle like masses of snow among the dark green leaves.

The yellow-headed egret, while with us in summer, is commoner, and roams about in larger flocks than the latter. A third and solitary species, Herodias flavirostris, is also found, and may be distinguished by its yellow bill, and the tuft of snowy feathers which surmounts the occiput. We have, besides, five or six other species of heron, nearly all remarkable for their elegance and beauty. The egret is much admired by the sentimental Chinese, and is often alluded to in poetical compositions by the style Loo-sze; and the Island of Amoy is often poetically called Loo-mun, Loo-keang, and Loo-taon, from the number of these snow-like birds that annually frequent it.

Of the ninety-two species of Insessores found here, nine are British birds. Seven species of the Grallatores, and nearly all the Natatores, with the exception of the pelicans, albatrosses, and a few gulls and terns, are identical with those found in Great Britain; and again, many forms that exist in Europe, though not discoverable here, are represented by very similar and closely-allied forms.

I think here, for the present, I may close my remarks on the Fauna of Amoy, without proceeding to discuss the Reptilia, Pisces and Insecta, as it would require a person much more thoroughly versed in Natural History than myself to undertake it.

It is unnecessary to dilate on the beauties and delights of the study of Nature: the heart of every man naturally throbs in the contemplation of the Creator's handiwork, and thrills with joy at the discovery of some new manœuvre in the wondrous economy which so beautifully modulates and arranges all animal and vegetable life upon the globe. Solomon said, "There is nothing new under the sun;" so, probably, there is not; but a great deal of what passes around man is new to him, and astonishes him when brought to his notice, simply because he has not made use of those powers of observation that he has been endowed with.

In conclusion, I cannot do better than quote the words that Milton puts in the mouth of the Divine Author of Nature in his address to our first parent:—

> " Is not the earth
> With various living creatures, and the air,
> Replenish'd ; and all these at thy command,
> To come and play before thee ? Know'st thou not
> Their language and their ways ? They also know,
> And reason not contemptibly. With these
> Find pastime."

ROBERT SWINHOE.

Amoy.

On Marine Mollusca in Aquaria.

By CHARLES BRETHERTON, Esq.

THE Mollusca are, generally speaking, ill adapted for the purposes of ordinary aquarians. Though many are equal in beauty to the handsomest zoophytes, the difficulty of preserving them has effectually prevented their becoming popular. Many require particular attention or accommodation different from that of an ordinary tank ; and as a group their habits are but little interesting, and their actions monotonous. To those who devote themselves to the study of the Mollusca, the use of the aquarium is almost indispensable : it is impossible to observe accurately their forms, except in their native element, and in the small species this is a work requiring continued study. To learn their habits and follow their metamorphoses the aquarium is still more necessary.

Observations on animals in aquaria usually consist of notes on their peculiarities of habits, but shell-fish afford very little matter of this kind, on account of the great uniformity and similarity that prevails among them in this respect. Like all marine animals, they require a twofold sort of attention : in the first place, they require that the conditions under which they naturally exist should be in some measure reproduced in confinement ; and secondly, proper food. Most shell-fish can be kept either in a vessel with sea-weed, and a bottom of shingle or stone, or in one with a deep bottom of pure sand. It is not advisable to combine the two, though often recommended. An ordinary aquarium with a layer of sand at the bottom is more difficult to keep clean, and never looks so well as one with shingle or gravel. As a general rule, univalves should be kept on rock, bivalves in sand. As to food, the bivalves and tunicaries are infusorial feeders, and require no attention whatever ; the plant-eating univalves find food

for themselves in any ordinary aquarium, though some have particular tastes; and the carnivorous univalves have to be supplied with appropriate food, consisting very frequently of their bivalve relatives. The latter are evidently the most troublesome to keep.

Purpura Lapillus, our commonest muricidal animal, is as easily preserved as procured. It is a hardy mollusk, and will live without food for more than a month. It should be fed with mussels, a small-sized one, an inch or an inch and a half long, being given every week. They seem to form its habitual food. I have kept it with oysters, Modiolas and periwinkles, but it has never molested them. It perforates and devours its victim in two or three days. The perforation is more or less rounded, about $\frac{1}{15}$th of an inch in diameter, and, as the outer layer of the shell is more rasped away than the inner, somewhat funnel-shaped. The proboscis is inserted through the hole, and attenuated for that purpose; it varies in thickness accordingly as it is more or less elongated. I have seen it inserted. This shell-fish is shy, and not very active in its habits, and becomes more than usually sluggish when kept without food. It will oviposit in confinement, but some capsules deposited in March were not developed in July, when they were unintentionally destroyed.

I have never fed any of the other Muricidæ. Some can be more easily kept than others; thus, Fusus antiquus is much more active and hardier than Buccinum undatum.

Natica monilifera belongs to quite a different group of Gasteropoda, the sand-inhabiting mentiferous tribes. It lives well if kept in sand and supplied with food, but cannot endure privation of food. It lives buried, and seldom shows itself. It can crawl quickly over the sand, and pursues in it the bivalves, killing and devouring those it can detain in the grasp of its large and flexible foot, which it uses as an organ of prehension. It can kill those the size of a cockle or a little larger, but a full-sized M. solida is too strong for it, and can live with it with impunity. Cockles do very well to feed it with, as they are easily procured, but other bivalves seem to be more to its taste. It always devours its prey buried in the sand. If it captures it on the surface, it buries itself with it. A cockle once a week is sufficient. It will also devour, in aquaria, small M. solida and Mactra stultorum, Tellina solidula and Donax anatinus. I have tried to feed it with mussels, and observed it exsert its proboscis and touch them; but it always left them afterwards, without boring. The holes it makes are rather larger than those of the Purpura, but of the same shape and appearance; they are usually through the umbone.

In a cockle there is one on the umbone carried through but not completed, and another, completed, towards the middle of the valve; in a Donax it is of irregular shape, and on the hinge-line between the valves. The Natica maintains communication with the surface, when buried in the sand, by a good-sized hole, that probably communicates with the branchial chamber on the left side. When creeping above the sand, the left posterior angle of the mentum is raised so as to admit the water to the gills. The tentacles are but little developed, and laid back against the shell when the animal is first exserted, but when it becomes more familiarised with its situation they stand erect, of considerable length, arcuate, with their convexity forwards. The drawing in the 'British Mollusca,' by Mr. Spence Bate, is mostly incorrect; Arthur Adams has drawn it better, but, as in other figures of his, the animal seems somewhat contorted. The mouth is provided with two horny jaws, of the same character as that of Triton, figured in the 'Manual of the Mollusca:' they are irregularly triangular, striate, with one side strongly serrated. The lingual ribbon is less than a third of an inch in length. The jaws are horny brown, the buccal mass red, the proboscis white; the latter, when exserted, seems rather thick, but must be capable of attenuation to pass through the small holes it makes. Though it devours its victims pretty completely, there is always some animal matter left, which blackens all the sand round it when it decays. Unless the shells are removed as soon as the Natica leaves them, the sand in which it is kept becomes after a while unfit for use. The former expedient is difficult to adopt, as the only indications of an animal's death are the disappearance of its siphons, and the presence of the Natica in its neighbourhood. Natica can creep up the glass, but does not adhere firmly; it leaves a slimy trail.

Turbonilla, *Loven*. These minute animals afford strong proof of the utility of the aquarium to the working student. Speaking of the difficulties of, and perseverance required in, the observation of these little creatures, Mr. Clark says they must be studied "with a regular supply of fresh specimens, as torpidity always ensues in less than twenty-four hours." As far as my own limited experience extends, they will remain lively in the aquarium for at least a month or so. I can confirm his statement that T. (Chemnitzia) pusilla has the foot produced behind and pointed, while T. (Chemnitzia) elegantissima is said to have it rounded behind and shorter. It creeps quickly over the sand and glass, but very frequently falls off the latter. The shell is dragged rather than borne; the mentum is carried in the same

position as the head of Rissoa,—it is narrower than, and carried in advance of, the foot. Clark, and Gray after him, call the mentum the head; but, as the former himself says the proboscis issues under the tentacles and above the mentum, it does not seem likely that it really is so. I have never seen the proboscis exserted.

Capulus hungaricus, contrary to what might be expected from its sedentary habits, could move for a few inches even on the smooth erect sides of a glass jar. The proboscis or rostrum (like that of Cypræa, it seems to be of an intermediate character) is capable of extension, and can be produced beyond the shell. I have not succeeded in preserving it for any length of time. Like most of its relatives, its habits and food are very imperfectly understood.

Hydrobia Ulvæ. It is difficult to place much confidence in drawings of animals of the Mollusca, when we find this common and easily-observed mollusk most incorrectly represented, both in the 'British Mollusca' and in the 'Genera of Shells.' Besides incorrectness of proportion, which it is not easy to specify with accuracy, both Forbes and A. Adams have made the foot triangular and pointed behind, instead of oblong and obtusely rounded; they also make the opercular lobe narrower than the foot, instead of extending over the sides as in Bithinia. Adams has also given the rostrum a curious twist upwards. The emargination of the rostrum is caused by the retraction of the buccal mass, and disappears when it is applied to any surface; it then has a slightly globular or inflated appearance. In the text of the 'British Mollusca' the foot is correctly described. There is a distinct marginal groove across the front edge of the foot, which does not extend quite to the tips of the auricles. The foot is thus bilabiate, or provided with a linear duplication as in Littorina. There is a curious and easily observable process or fillet issuing from the anal angle of the aperture, the use of which is unknown. The male organ is in the usual place, falcate, compressed, lead-blue sprinkled with yellow. The fœcal pellets are oval, brown, often clustered; they have not bred in confinement, though they grow to a very large size, some being as much as one-third of an inch in length. Clean specimens have the shells chestnut-brown, lighter near the sutures. When taken on the shore they are of a dark brownish green, and hardly half of the size they attain in confinement. The young have the shell more or less translucent, and the animal colourless; the black bars on the tentacles appear first as a sprinkling of black dots. The buccal mass is,

I believe, always coloured red. They are abundant on the grassy weed on the stones in sandy places in spring.

Gosse says that Rissoæ (including this species) are precarious, but I have not found them so. They eat Confervæ and weed, like periwinkles in confinement, but they are often found in abundance on sand-banks where there is no weed at all. They creep with ease over sand, rock and glass: most shell-fish that inhabit sand adhere very imperfectly to stone and glass, but this is not the case with this species.

Littorina. The common periwinkle is often recommended as a scavenger in the same mode as the fresh-water snails. The very insufficient cleaning they bestow on the sides is generally far more than compensated by the amount of weed they destroy. Though so often kept, this periwinkle does not seem to breed in confinement, and its spawn is little known. The viviparous species breed freely: L. saxatilis, one of the varieties of L. rudis, began to breed in January. The young have chestnut-brown shells and white animals: the signs of immaturity are the uniform thickness of the tentacles and their bluntness, the large size of the head in proportion to the foot, and the distinctness of the eyes. These little periwinkles do very well in the aquarium, as they are prettily marked and hardy. They require to be closely covered, as they often creep out of the water, and attach themselves by a sticky exudation. They are here found in the highest part of the littoral zone, or rather high up on a lighthouse in the lower part of the littoral zone.

Nudibranchs are noted for what is called their delicacy of constitution. The real difficulty in keeping them is to supply them with appropriate food. A Doris will dwindle away to half its original size before it will give up the ghost: they die from starvation. Doris pilosa is hardier than D. bilamellata, and some of the small species seem to live still better. I never kept one more than two months, but I never paid them proper attention. They feed on Bryozoa and small zoophytes, and spawn in spring and autumn. The spawn of D. pilosa is developed in a few days. The free-swimming larvæ all die away before casting their shells; they cluster about the surface of the water in considerable numbers. They are often compared to Pteropoda, but their lobes or wings are not moveable, and their easy gliding motion is caused by ciliary and not muscular action. Though so very minute, their peculiar motion enables them to be distinguished by the naked eye. The free-swimming larvæ of barnacles can be distinguished in the same manner.

Eolis papillosa creeps very quickly, and is lively in its habits. It is fond of squeezing its flaccid body into crevices and narrow places. I have fed it with anemones. One, two and a half inches, ate every week an Actinoloba Dianthus about an inch in diameter. The tube on the right side of the body can be exserted to some length.

Cylichna obtusa. These animals live in sand, moving about slowly, with the head, disk and fore part of the shell buried, and leaving a very distinct trail. They feed on Hydrobiæ, which abound on the sand-banks where the Cylichnæ are found. They can crawl on glass and stone as well as through the sand, but the least obstacle causes them to lose their hold and fall. They progress by pushing forward the foot, and then drawing the shell after it. Unlike the larger species of the same genus, the tongue seems to be unarmed. I have not found them do well in aquaria.

Chitons live well in confinement. It is not known exactly what they feed upon, but I have noticed the common Chiton scrape the glass like a periwinkle. The appearance of the tongue when in action is very peculiar, resembling the opening and closing of a fan. They creep about freely, but their motion is slow. A small specimen of Chiton cinereus, nearly white, has not grown during a year's confinement. Mollusca very frequently become stunted in aquaria, from want of sufficient nourishment. It is very frequently the case with fresh-water snails, which sometimes also become distorted.

Bivalves are less interesting than univalves in aquaria; an accurate examination of a bivalve, moreover, cannot be made without destroying, to observe, the branchiæ and palpi. They generally live very well, and as they require no feeding they are very little trouble to keep. Some require a deep bottom of fine sand, and others do well in an ordinary tank.

The oyster is one of the latter class, and, as it is probably the hardiest of bivalves, it is very suitable for keeping an ordinary tank free from the spores of the weeds, — a service for which the presence of some Acephalæ is indispensable. Mussels may be used for the same purpose, and if handsome specimens are selected they are more ornamental than oysters, though not so hardy. Young mussels are often abundant on whelk. The siphonal apertures are at first plain-margined, and, in the very young, ciliate; the branchial one afterwards becomes laciniate, and as they advance in age the laciniations become more and more complicated. The mantle is more protruded than in the adult, and the terminal character of the umbone less

marked. They are more active than the mature ones. Like all byssiferous bivalves, they can detach their byssus and move about. When the water is insufficiently aërated they usually move to the surface. Their track is marked by the detached threads they spin to assist them in climbing.

Modiola Modiolus I have found hardier than the mussel and more sedentary. They seldom, if ever, move from where they are placed. The mantle is of a dirty brown with white spots, and its margins are plain; the anal siphon is distinct from the branchial, and has sometimes a laterally-compressed conical appearance.

Crenella marmorata can be easily kept, and its siphonal developments are rather peculiar: the anal siphon is tubular, and can be protruded nearly as long as the shell; the branchial gape extends from half-way up the anal siphon to the middle of the ventral range, opening wide enough to show the branchiæ; the two margins of the mantle that form it are plain and often much protruded. The foot can be drawn out to twice or thrice the length of the shell. The siphons are white tinged with purplish red. They are active and lively animals, and often conceal themselves in crevices or tufts of weed. They do not seem to suffer from being cut out of the tests of Ascidiæ: my specimens were obtained in this manner.

The habits of the sand bivalves, Mactra, Tellina, &c., are all similar, and they require to be kept in the same way, viz., in a bottom of pure sand. They seldom move when once buried. I have preserved several species without difficulty, but, as they show nothing but the tips of their siphons, they are not very interesting. The siphons of bivalves vary much in length, but they are often figured and described as shorter than they usually are. Cockles do not bury so readily as the others, and their short siphons oblige them to keep near the surface. Tellina solidula has a peculiar habit of writhing the inhalent siphon, and touching the surface of the sand with its tip, sucking in small particles, which can be seen through the translucent tube. T. tenuis seems to be destitute of this peculiarity. Young tapes will suspend themselves to the glass sides like young mussels.

Saxicava lives well, but is liable to be stifled by the thick, matted and slimy Confervæ often common in long-established aquaria. They either live uncovered, or bury themselves in the shingle. The siphons of S. rugosa are generally nearly as long as the shell. When the Confervæ gathers round them they are entirely retracted,

and the animal soon dies. Saxicava possesses limited powers of locomotion.

Pholades are best preserved unburied, and will live very well, though never found so naturally; but if kept in the same vessel with crabs or other voracious animals, the latter soon destroy them. They cannot move. The siphons vary in shape; their adventitious covering falls off in confinement, and they become white. Most bivalves live naturally in a vertical position, and when Saxicava and Pholas are kept unburied and horizontal they curve their siphons with the orifices upwards. The foot can be a little exserted and moved. It seems that none of the bivalves that bore in rock or other hard substances can form a new dwelling if removed.

Ascidiæ and Cynthiæ can be preserved in ordinary aquaria, but the former require to be kept clean and free from Confervæ, and they soon die if they get foul. Cynthiæ are not injured by dirt.

CHARLES BRETHERTON.

47, Hamilton Square, Birkenhead,
August 23, 1858.

Occurrence of Actinia gemmacea at Weymouth.—It may be interesting to the readers of the 'Zoologist' to know that I obtain Actinia gemmacea (Haliaëtis gemmacea, *mihi.*, in 'Zoological Proceedings'), on this coast; they are not in very large numbers, and are of a lovely colour, far brighter than the Devonshire specimens. My man brought me eighteen on Saturday last. I do not particularize the spot further than by saying it is within four miles of Weymouth, inasmuch as I am sorry to say that in this part there is a system of extermination carried on by visitors, and to which Asplenium marinum and Actinia clavata have already fallen victims, and even Anthea cereus and Actinia Mesembryanthemum are becoming rare; hence I intend for the future to keep exact localities to myself, not from selfishness, but simply from a well-grounded fear of extirpation.—*William Thompson; Weymouth, August* 30, 1858.

Note on the Pertinacity of the Spotted Flycatcher in its choice of a place for Nidification.—About the end of June last, a spotted flycatcher began to build a nest over the door of the lodge at the entrance of my grounds. The woman who lives in the lodge, not wishing the bird to build there, destroyed the commencement of the nest: every day for a week the bird placed new materials on the same ledge over the door, and every day the woman removed them, and, at the end of the week, placed a stone on the ledge, which effectually baffled the flycatcher's efforts at that spot; but the bird then began building at the latter end of the ledge, from whence it was also driven away, and, three stones being then placed on the ledge, the bird relinquished

the attempt to build at either end of it, and commenced building a nest on a beech-tree opposite, which it completed, and laid two eggs in it. When the bird was thus apparently established in the beech-tree, the stones over the door were taken away, when the flycatcher immediately forsook its nest and eggs in the beech, and again commenced building over the door, on the part of the projecting ledge which it had first chosen. The nest was again destroyed, and two slates placed over the spot; the bird contrived to throw down one of the slates from a slanting to a horizontal position, and then began to build upon it. The nest was again destroyed, and the three stones replaced and kept there a fortnight, after which they were again removed, and directly they were taken away the bird again began building. The nest was subsequently destroyed several times in succession; the bird was twice driven away by a towel being thrown at it; a stone wrapped in white paper was placed on the ledge to intimidate it, but the flycatcher still persevered, completed a nest and laid an egg. On hearing the circumstance I directed that the persecution of the poor bird should cease, after which it laid two more eggs, hatched all three, and successfully brought off its brood. —*J. H. Gurney; Catton Hall, Norwich, September* 10, 1858.

Motacilla campestris and M. boarula.—I write in order to notice a somewhat singular circumstance respecting the Ornithology of this district. Until the year 1855 a common species in this neighbourhood was Ray's wagtail (*Motacilla campestris*), being found extensively both on the verge of the moor-land near Richmond, and also in the corn and ploughed fields. The gray wagtail (*Motacilla boarula*), on the other hand, was by no means abundant, notwithstanding that the rocky banks of the river Swale were well adapted for the nidification of this species. For the last three years, however, the case has been exactly reversed; Ray's wagtail has visited us each year in gradually decreasing numbers, until this season (1858) I have only observed two pairs, whilst dozens of M. boarula are to be found within a short distance of the town. It has been suggested that the enclosure and cultivation of some waste land, which they formerly greatly frequented, may have partly caused their retreat; this reason can, I think, however, hardly hold good, since, in some other districts, the birds appear to select cultivated land in preference to that which lies waste, and, although deprived of it here in one instance, there is of course plenty of moor-land to which they could still betake themselves.—*Henry Smurthwaite; Richmond, Yorkshire, September* 4, 1858.

Emberiza nivalis.—Having lately returned from North America, where I had frequent opportunities, during the winter, of observing the habits of the snow bunting, I am glad to have it in my power to corroborate Mr. Mathews's assertion as to its perching on trees, and his remark (Zool. 6208), "and if I persisted in following it up, would at last fly off and alight on the hedge, or else on one of the trees," is exactly similar to what I have noticed; for, when either much disturbed or fired at, they would occasionally leave the stubble in large flocks and fly into the neighbouring trees, which then appeared as if clothed with white foliage. They were more than once shot, both by myself and sons when thus settled among the branches: moreover, they cannot only perch on "low broad railings" as stated by Mr. Doubleday (Zool. 6094), but on the small twigs of the topmost branches. The same writer further observes, "that the pure black and white plumage is their summer livery." Not having been in the Arctic Regions, where this species is said to breed and pass the summer (North America being its winter quarters only), I cannot undertake to say what the plumage may be at that season, but I think Mr. Doubleday's description of it, "pure black and white," is far more like that of the snow bird (*Fringilla nivalis*), than that of Emberiza nivalis. He

quotes Mr. Selby, who says the snow buntings "never perch on trees," to prove his own assertion, "in no instance have I ever seen one attempt to perch on a bush or tree." Probably Mr. Selby may have seen but occasional stragglers, and those in an open country where no trees were at hand, for, had he visited North America, he could not have failed to have observed what I have above described. It only shows how cautious we ought to be before pronouncing a decided opinion on the habits of birds that only occasionally fall under our notice. Mr. Abraham, of Kingston, Canada West, a very intelligent bird-stuffer (to whom I was more than once indebted for information), had a caged snow bunting which constantly made use of the perch. As to the editorial query (Zool. 6094), "Was the pied flycatcher the bird that he saw?" I should say decidedly not, for the following reasons:—In the first place, I must notice their great dissimilarity in size; for the pied flycatcher, according to Macgillivray, measures but $5\frac{1}{4}$ inches in length, and 8 inches in extent of wings; whereas the snow bunting, according to the same author, is $6\frac{7}{12}$ inches in length, and 13 inches in extent of wings.* Secondly, the two birds are of a totally different shape, if not colour. Thirdly, a turnip-field is not a likely place, I should say, for the pied flycatcher to resort. Fourthly, the habits of the latter bird, differing so widely from those of the skylark, it is very improbable that they should associate. Fifthly, Montagu says, "This bird (the pied flycatcher), rarely if ever makes its appearance in the southern parts of the island." Sixthly, Macgillivray states, that "the pied flycatcher, which like the gray, is a summer bird in Britain, arrives from the middle to the end of April." But enough, I think, has been said to prove that it could not have been the pied flycatcher that was observed by Mr. Mathews, in January last. Had I reason to doubt its being the snow bunting I should be more inclined to set it down as either a female, or immature male, of the Lapland bunting (*Emberiza calcarata*), which is about the same size, and not very dissimilar in colour, for Temminck, tells us (vol. i. p. 323), "La fémelle a le sommet de la tête, le cou, le manteau et le dos d'un cendré roux avec des taches noires; une bande d'un blanc roussâtre suit la même direction comme chez le mâle; elle se réunit avec un trait blanc qui part de l'angle du bec; gorge blanche, bordée latéralement par une bande brune; la poitrine marquée de nombreuses taches grises et noires; les autres parties inférieures blanches; des taches longitudinales sur les flancs." According to the Prince of Musignano and Dr. Richardson, the Lapland bunting "frequently intermingles with larks."—*Henry W. Hadfield; Elgin, N. B., September* 8, 1858.

Another talking Canary.—Mr. Sotheby relates, in the 'Zoological Proceedings,' some particulars of a canary whose conversational powers made an approach to those of the little bird which, a few years ago, proved so attractive an exhibition in Regent Street. This bird was the only one hatched out of a nest of four eggs, and was forsaken immediately on escaping from the egg-shell; it was found nearly dead in the nest, placed by the fire in flannel, eventually restored to life and health, and brought up by hand. Separated completely from all other birds it became familiar with those who fed it. Its singing notes were totally different from those of a canary: at three months old it repeated the words "Kissie, kissie," and imitated the sound of kissing; and afterwards for hours together repeated "Dear, sweet Titchie; Kiss Minnie; Kiss me then dear Minnie; Sweet, pretty little Titchie," &c.: it also whistles the first bar

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* One shot by me on the 29th of October, 1857, measured $6\frac{1}{2}$ inches in length, and 12 inches in extent of wings.

of "God save the Queen," and imitates the sound of a dog-whistle occasionally used about the house. The object of my quoting these particulars is to throw an additional ray of light on that highly interesting subject, the natural source of instruction in song-birds: the facts recorded by Mr. Sotheby seem to show that song in birds, as in human beings, is entirely educational.—*Edward Newman.*

Nidification of Swallows.—Since my return from Canada, I have perused with some interest (Zool. 5755) Mr. Slaney's novel plan for ridding himself and others of the "nuisance so often complained of,"—*i.e.* the "procreant cradles," or nests of the martins, placed in the window-sills, and driving them from the dwelling-houses to the stables, and other out-buildings. Were these latter buildings generally like those of Hatton Hall this plan might possibly succeed, but we know the reverse of this to be the case, and that such buildings, for the most part, are of no considerable elevation, and with few or no windows, consequently totally unsuited to receive the nest of the martin, as designed by Mr. Slaney. Moreover, it is to be hoped there are still some few among us who would be inclined to pause before proceeding to carry out this sweeping or radical reform, which, if successful, would have the effect of driving this "confiding social bird," "the poor swallow," "this most harmless and interesting visitor, whose confidence in man's protection but too often leads to its own destruction," from the dwelling-house to the stable. This appears a somewhat cool and inhospitable way of treating "our generally welcomed guests,"—besides many persons might, I think, miss "the constant twittering and noise made during the breeding-season." However, it might be fairly asked, What better plan have you to suggest? I must confess that I know of none, unless our "zealous, officious and remorseless housemaids" could be taught to respect the nest of the martin, as they do that of the more fortunately favoured robin; but how that change is to be brought about I am rather puzzled to conjecture, unless the originator of this well-meant scheme would either indite some pathetic tale or parody the 'Babes in the Wood,' which possibly might touch the hearts of some of the young "remorseless housemaids," but as to the old maids, whose hearts and feelings may be blunted, and not likely to be worked on or affected by either poetry or prose, I would suggest for them that they be duly admonished by their lords and masters, and moreover made thoroughly to understand that for the future no inversion of the broom-handle will be allowed or even tolerated, but that the staff of this most necessary household implement must be strictly confined to its destined use. I also observe in the 'Zoologist' (Zool. 5790) an article on the same subject by Mr. R. Smith, in which the following passage occurs:—"But yet I think it should be recorded, that in one instance, to my certain knowledge, a swallow did construct its nest in such a position,"—*i.e.* under the eaves. "The nest seemed very rickety, and loosely attached to the sill, and, unlike the martin's nest, the top was not attached to any part of the projecting eaves, there being a space of about three inches between the two, by which the old bird made its entrance." In confirmation of Mr. Smith's assertion, and in reply to the editorial query at the foot of the page (Zool. 5756), "Does not the writer Mr. W. Slaney refer exclusively to martins?" I beg to transcribe (having nothing to offer of my own) a few lines in elucidation of the subject from the work of the late Professor Macgillivray, vol. iii. p. 567, Hirundo rustica:—"The materials of which the nest is composed, as well as its form, vary according to circumstances. Thus, in August, 1834, I observed several nests of this species stuck beneath the eaves at the end of an outhouse on the farm-steading of Granton, in Dumfriesshire.

They varied considerably in form and size. Those in corners were of an irregular, rounded shape, rectangular above, where they were fitted to the angle, convex in front, and having on the side at the top a semicircular aperture. In general, the nest is open at the top, when not fastened under a beam or in a corner, &c."—*Henry W. Hadfield; Elgin, N. B., August* 26, 1858.

Extraordinary Variety of the Common Nightjar.—Under the above heading (Zool. 5278) I recorded the occurrence, in July, 1856, of two most singular varieties of the nightjar, a bird that rarely varies in plumage: these specimens, which were young birds of that season, were killed near Holt, in this county; and singularly enough, a few days since, an adult bird exactly resembling the above, except in age, was shot in the same neighbourhood. I am not aware that any pied specimens of this species were observed in that district in the summer of 1857, but it would almost appear from this circumstance that one of the original pied brood had escaped destruction, and returned in an adult state to its old quarters. This specimen had the throat, breast, belly and vent with the wings and three middle tail-feathers pure white.—*H. Stevenson; Norwich, September* 7, 1858.

Note on the late Nesting of the Wood Pigeon.—Both the wood pigeon and the stock dove often nest very late in the year, as an instance of which, in the case of the wood pigeon, I may mention that my son found one of these birds this morning, sitting on two eggs in a nest built in a thorn tree in my park.—*J. H. Gurney; Catton Hall, Norwich, September* 10, 1858.

The Red Grouse and the Willow Grouse.—With reference to my late communication, touching the identity of our red grouse with the Norwegian willow grouse (Zool. 6209), I think two out of the three difficulties raised by Mr. Newman can be explained in a satisfactory manner. Mr. Newman's *first* objection, *viz.* that "the willow grouse turns white in winter, in the same manner as the ptarmigan, whereas the red grouse, although inhabiting the same districts, exhibits no such tendency," is, I think, easily explained by the fact of the red grouse in this country never having to experience the same severity of climate that the willow grouse has to endure in Norway. That the ptarmigan in Scotland turns white in the winter-time is perhaps accounted for by the supposition that it inhabits mountain regions higher than those frequented by the red grouse. I am not sure, however, that I am correct in this supposition, but it is a matter easily ascertained. *Secondly*, Mr. Newman says the wings of the willow grouse are always white, those of the red grouse never. However reluctant I am to offer an opinion at variance with so great an authority, I trust he will pardon me for thinking he is incorrect here. The wings of the willow grouse which I flushed in the Dovrefjelds were certainly not white, but of a light tawny-brown colour (so far as I can recollect about the same colour as the back of the land rail). I am sorry I did not examine the wings of the specimens in the Christiana Museum more closely, but my present impression is that those in the summer plumage had not the wings white, but more or less mixed with brown, like the rest of the body. Had the wings been entirely white (as Mr. Newman suggests) I should surely have noticed the peculiarity. On this point, however, I will not be certain, for the wings might possibly have been concealed more or less by the bringing forward of the shoulder feathers. The *third* objection (that the beak of the willow grouse is much stronger than that of the red grouse), is a serious one, no doubt, and if correct entirely upsets my speculations on the subject, as it may fairly be regarded as a specific character. When comparing specimens of the willow grouse with the ptarmigan in the Christiana Museum, the smallness of the beak of

the latter was very conspicuous in comparison with the stout beak of the former. I did not, however, remark that the beak of the willow grouse was any stouter than the beak of our red grouse; had it been otherwise I think I should have noticed it. This latter point appears to me to be the most important question to solve, and I trust that some reader of the 'Zoologist' having specimens of both species will carefully compare the two, and communicate the result in an early number.—P.S. Three slight inaccuracies occur in my communication above referred to. In the 9th line *apical* should be *species of;* in line 16 *dead* should be *dense;* and in line 24 *field* should be *Fjeld.*—*G. Norman; September* 3, 1858.

[I have an almost unconquerable aversion to that propensity, so dear to British naturalists, whether zoologists or botanists, to raise those infinitesimal varieties which occur in Great Britain to the rank of species. Lepus hibernicus, *Bell;* Pontia Chariclea, P. Metra and P. Sabellicæ, *Stephens;* Satyrus Polydama, *Stephens;* Lycæna dispar, *Haworth;* Polyommatus Artaxerxes, *Lewin;* Thymele Lavateræ, *Haworth;* Trichomanes brevisetum, *Brown;* Hymenophyllum Wilsoni, *Hooker;* Equisetum Drummondii, *Hooker*, are British species that have obtained rather voluminous notice at my hands, with the view of proving that they were identical with species previously well established. When, therefore, Mr. Norman's note came to my hands, it touched a chord that instantly vibrated in unison: I have always maintained that it was highly improbable we should possess in abundance a bird that was unknown elsewhere in the world. Great however as this improbability may be, we must not hastily link our British grouse to another species, provided it possess a single *constant* diagnostic character. What Mr. Norman has to say on this subject, my own objection to his views, and Mr. Norman's rejoinder, are now before the readers of the 'Zoologist.' I will not invite Mr. Gould, who appears somewhat pledged to an opinion, but I do earnestly invite the four ornithologists, who are *par excellence* the *British* ornithologists, to express candidly and fully their opinions on this interesting question. I allude of course to Mr. Doubleday, Mr. Bond, Mr. Salmon and Mr. Wolley: I know that all these gentlemen are constant readers of the 'Zoologist,' and I am sure all will be able to throw light on a subject of such importance. I shall be extremely gratified to publish their views in the November 'Zoologist.'—*E. N.*]

Varieties of Black Grouse and Hybrid between Blackcock and Capercally.—I have recently examined a very interesting collection of grouse, brought from Russia by Lord Wodehouse, of Kimberley, collected during his recent Embassy at St. Petersburgh: amongst these are some pied varieties of the black grouse, which are the more striking from this species so rarely exhibiting the slightest variation in plumage. Hybrids between the black grouse and capercally, in countries where both species are plentiful (as in Russia), are, I believe, not unfrequently met with. The following are the most worthy of note:—

No. 1. An adult male blackcock with the wings, scapular, flanks and upper tail-coverts white, the centre only of each feather having a dark streak along the line of the quill, in some scarcely broader than the quill itself. The breast and back are mottled with white, like some varieties of the common blackbird, and the feathers on the legs are also very light.

No. 2. A gray hen mottled all over with white feathers, the remaining portion being of the usual tint. This specimen much resembles occasional varieties of the common partridge.

No. 3. A gray hen gradually assuming the cock's plumage. In this specimen the

feathers on the throat and breast are becoming grayish black, with slight purplish reflections; the feathers on the back are likewise edged, more or less broadly, with circular bands of dark purple, shining with a metallic lustre; the tail feathers are slightly curved outwards, after the manner of the male birds.

No. 4. A very light buff-coloured variety of the gray hen, bearing all the usual markings in its plumage, but fainter in tint than is usually the case.

No. 5. A specimen of the Tetrao medius, or Urogallus hybridus of authors. This cross between the capercally and black grouse so exactly corresponds with the description of a specimen exhibited by Mr. Gould at the Zoological Society in the spring of 1831, that an extract from the 'Proceedings' of the Society at that date may suffice for the present instance:—"The beak is black, the shining feathers on the front of the neck are rich Orleans plum-colour, and of the eighteen feathers of the tail the outer ones are the longest. In the cock-of-the-woods the beak is white, the feathers on the front of the breast are a dark glossy-green, and the centre feathers of the tail the longest."

According to Mr. Yarrell, "The size and colour of these hybrids greatly depend upon whether they have been produced between the capercally cock and gray hen or *vice versa*." Females of these hybrids appear much more rare than males.—*H. Stevenson; Norwich.*

Occurrence of the Pigmy Curlew at Weymouth.—On the 28th of this month I bought an adult pigmy curlew, for which I gave twopence; it was shot with a number of purres, all young, and was offered me tied up in a bunch with them.—*William Thompson; Weymouth, August* 29, 1858.

Snipes Neighing or Humming.—On the origin of the neighing sound which accompanies the snipe's play,—that is, its flight during pairing time,—opinions are various. Bechstein thought it was produced by means of the beak; Naumann and others that it originated in powerful strokes of the wing: but since Pralle, in Hanover, observed that it uttered its well-known song or cry, which he expresses by the words "gick jack, gick jack," at the same time with the neighing sound, it seemed to be certain that the latter was not produced through the throat. In the meantime I have remarked with surprise that the humming sound could never be observed while the bird was flying upwards, at which time the tail is closed, but only when it was descending in a slanting direction, with the tail strongly spread out. The peculiar form of the tail-feathers in some foreign species nearly allied to the common snipe, for instance, in Scolopax javensis, encouraged the notion that the tail, if not the only cause, is in a considerable degree concerned in the production of the sound. On a closer examination of the tail-feathers of our common species, I found the first outer feather especially very peculiarly constructed; the shaft uncommonly stiff and sabre-shaped; the rays of the web strongly bound together and very long,—the longest reaching very nearly three-fourths of the whole length of the web, their rays lying along or spanning from end to end of the curve of the shaft, like the strings of a musical instrument. If we blow from the outer side upon the broad web it immediately vibrates, and a sound is heard, which, although not so loud, resembles very exactly the well-known neighing. In order to convince myself fully that it was the first feather that produced the peculiar sound, it was only necessary for me carefully to pluck out such a feather, to fasten its shaft with fine thread to a piece of steel wire a tenth of an inch in diameter and a foot long, and then to fix this at the end of a four-foot stick. If now I drew the feather, with its outer side forwards, sharply through the air, at the same time making some short

movements or shakings of the arm, so as to represent the shivering motion of the wings during flight, the neighing sound was produced with the most astonishing exactness. If I wished to hear the humming of both feathers at once, as must be the case in the flying bird, I found this also could be managed by a simple contrivance. I take a small stick, and fasten to the side of the smaller end a piece of burnt steel wire in the form of a fork; then I bind to each point a side tail-feather; then bend the wire so that the feathers receive the same direction which they do in the spreading of the tail as the bird descends in flight; and then, with this apparatus, I draw the feathers through the air, as before. Such a sound, but in another tone, is produced when we experiment with the tail-feathers of other kinds of snipe. But in Scolopax major, S. capensis and S. frenata are found four humming feathers on each side, which are considerably shorter than in the species I have been speaking of. Scolopax javensis has eight feathers on each side, which are extremely narrow and very stiff. Since in both sexes these feathers have the same form, it is clear that both can produce the humming noise; and by means of experiment I have convinced myself that it is so.—*W. Meves; Conservator of the Zoological Museum at Stockholm.*

[Mr. Wolley, who saw the experiment repeatedly performed, was perfectly satisfied that this mode of explaining the neighing is the correct one.—*Edward Newman*].

Duck breeding in a Church Tower.—The 'Sussex Express,' of July 24, gives, in answer to inquiries, further information respecting the duck nesting in the church tower of Bosham (not Rottingdean, as appears from the omission of the former name), which is noticed in the 'Zoologist' (Zool. 6144). Two ducks were originally observed on the weathercock of the church, probably a pair, though that fact was not ascertained, one only having been seen within the tower, which bird was of the breed usually termed Muscovy. Many persons witnessed her flying to and from her elevated nest, where she had several visitors, and where she sat upon twelve eggs, of which eight proved productive, but unfortunately solicitude for the safety of the young ones caused them to be carried down by hand, so that the problem how the old duck would have conveyed her progeny to the ground was not solved. The above-named newspaper states that another duck of the same kind, elsewhere in the parish of Bosham, hatched twelve young ones in a pigeon-loft, bringing them all down herself, but how she accomplished it is unknown.—*Arthur Hussey; Rottingdean, August* 17, 1858.

Occurrence of the Little Gull near Barnstable.—On the 30th of last month I met a gentleman on the sands near Braunton Burrows, who had just had the rare piece of luck to shoot a brace of the beautiful and rare little gull (*Larus minutus*). I had these specimens in my hands ere they were cold, and noted that they were birds in an intermediate state of plumage, but looking so near the adult stage that I should think it probable that, had they lived, next spring would have seen them in the rare mature plumage. I believe it to be a fact that the gulls (like the falcons and some other of our birds) go through several moults before they arrive at that peculiar plumage which marks an old bird. A gentleman has told me that he watched, this spring, a large breeding-station of the herring gull (*Larus canus*), and was struck by the fact that the brown birds (*i. e.* birds of the year before) kept aloof from those then actually breeding, and seemed to be waiting their time until they had reached their perfect breeding plumage. The two specimens of the little gull I allude to had the crown of the head and back pale French blue; on the nape of the neck was a black patch, almost forming a ring round it; the wing-feathers were broadly marked with transverse bars of a rich black; the tail appeared short and broad even for a gull, and the beak and legs were

greenish black. I had nothing with me to measure the length of the birds, but their bodies appeared no larger than a pigeon's.—*Murray A. Mathews; Raleigh, near Barnstable, September* 6, 1858.

Shark on the Coast of Sussex.—The 'Sussex Express,' of August 14, states that a specimen of the porbeagle shark, 6 feet 8½ inches long and 3 feet 8¾ inches in circumference, was captured in Seaford Bay by the crew of an Eastbourne mackarel boat during the night of August 8.—*Arthur Hussey; Rottingdean, August*, 1858.

Occurrence of the Sunfish at Berry Head. — A specimen of the sunfish (*Orthogariscus mola*) was shot this day, August 14th, by a yachtsman, about a mile off Berry Head, the southern extremity of Torbay, and brought into Torquay, where it was exhibited by two fishermen. It measured 2 feet 4½ inches in length, 3 feet 2 inches between the extremities of the fins, and 14½ inches in greatest breadth, exclusive of the fins. This is the second specimen of this remarkable fish captured here this summer.—*William Pengelly.*

Additions to the Butterfly Fauna of South Wales.—I have certainly three, and I believe four, more species of butterflies to add to the Fauna of South Wales, as "Area 6:"—Colias Edusa, Leucophasia Sinapis, Polyommatus Agestis, and I believe P. Acis too; of this latter I will not say for certain, because it is so rare and local a species, but I herewith send you a very careful description, which I write with the insect before me, and from which perhaps you will be able to decide. The three first species I have seen on the wing and taken this month, while on a short tour in search of health, in company with a young brother of the pin and net, and it was he who took P. Acis about three weeks back, and shewed it me to have my opinion upon it: I have no doubt he would allow me to send it you for inspection, if you are not satisfied of its identity,—I am myself, but dare not record it on my own conviction only, when the female Cardamines has been mistaken for Daplidice. You will now think with me that the area lately given without a representative is one of the richest, for we may hardly expect P. Artaxerxes, C. Davus, P. Actæon or E. Blandina; and C. Hyale, P. Arion, C. dispar, P. Daplidice, A. Lathonia and V. Antiopa are almost as unlikely to visit us, so that we have but little that is probable to hunt for now.—*Robert Drane; Cardiff, August* 21, 1858.

[The description certainly applies to P. Acis.—*E. N.*]

Polyommatus Artaxerxes and Agestis. — Mr. Newman, in his observations in last month's 'Zoologist' (Zool. 6211), makes it appear that I do not know the larva of P. Agestis. Now, I admit that I made a mistake by sending in a hurry the wrong larvæ to Mr. Logan: in my haste in collecting the larvæ, finding some small green larvæ with a purple marking, and without any examination, I sent them to Mr. Logan for the young of Agestis; but is this to go against eight years' practice and ten correspondents who have bred the insect this season from larvæ I have sent them? I will most fully atone for this error when I am on the ground again next June. I have never seen Mr. Newman's observations on this subject in the 'Entomological Magazine': if that gentleman wishes to break a lance with me he must take care it

does not get broken ; I think I have bent it for him already in the very first thrust. Mr. Newman has also made a great mistake in stating that the larvæ I found feeding upon pellitory were those of Vanessa Atalanta. I still positively state that they were Cynthia Cardui. (See 'Entomologist's Weekly Intelligencer' for July, No. 94, p. 125). After the Cardui were full fed, then came the Atalanta ; this I found out myself after I had bred some of them. — *H. J. Harding ;* 1, *York Street, Church Street, Shoreditch, September* 2, 1858.

[I am well aware that if I append a single word to this communication I give Mr. Harding the right of a second reply: to this he is most welcome; indeed, I think he is rather called on to give a little further explanation : if I clearly comprehend this communication, Mr. Harding admits that he did send to Mr. Logan, "without examination,' certain larvæ as those of Agestis in "error;" but at the same time he states that *this season* he has sent the right larvæ "to ten correspondents." Now, in his first communication, Mr. Harding only refers to what he did years ago and leaves untouched the fresh evidence of the present year. Of course I could only deal with the first statement while I was ignorant of the second, but Mr. Harding's reply above seems to corroborate my assertion, that the footless green larvæ mistaken by him for those of a butterfly were actually those of a beetle: is not this the very error for which Mr. Harding proposes to atone next spring? Then again, as regards Atalanta, did not Mr. Harding mistake the larvæ of Atalanta for those of Cardui? and did he not "find this out himself after he had bred some of them?" It seems to me absolutely impossible that Mr. Harding should not know the larva of Atalanta ; but how else shall we read his own explanation? I now can only say, in conclusion, that my friend Harding shall enjoy the unmolested privilege of a final reply, and that no editorial commentary shall be appended thereto.—*Edward Newman*].

The Artaxerxes Question.—I know nothing of the larva of P. Agestis, and therefore can give no opinion as to whether it is or is not a variety of P. Artaxerxes. It appears, however, to me, that till both species have been reared from the same larvæ, no one has a right to say that they are identical. I must confess that I am an utter unbeliever in what are called permanent varieties or races. If a so-called variety lays a brood of eggs which all produce a moth precisely similar to the parent, I maintain that this is the strongest possible evidence that this so-called variety is a species. Mr. Logan remarks (Zool. 6100) that he should never expect to rear Artaxerxes from an egg laid by Agestis, and *vice versâ*: he could not, to my mind, in the absence of other evidence, have used a more convincing proof that the species are distinct. I have never yet heard or read anything which has induced me to believe in the existence of permanent varieties or races in Lepidoptera. I do not think that the experiment has been tried upon a sufficiently large scale to warrant the adoption of any such theory. Mr. Harding remarks (Zool. 6211) that the larva of P. Alexis is very seldom found : I can only say that it is very plentiful here ; I have taken it by dozens when brushing Ononis campestris for the larva of H. marginata. I do not know whether the larva of P. Agestis is apodal, but that of P. Alexis certainly is not, at least not more so than the larva of the Thecla, which it closely resembles ; indeed a tyro would find it hard to distinguish between the larva of T. Rubi and P. Alexis. The latter can walk about perfectly well and crawl about its food-plant ; it drops at the slightest touch : the pupa, like that of T. Quercus, is enclosed in a slight web at the roots of the grass. I see no reason why the larva of P. Agestis should suffer from apodal affliction when its brother Argiolus is free to revel on the top of a holly tree, and I am at a loss to conceive why

Mr. Harding should have condemned it to so hard a fate. The coleopterous conclusion of the matter, however, may hold out a hope that better times are coming.—*H. Harpur Crewe; Stowmarket, September* 3, 1858.

Connexion of Polyommatus Agestis with Helianthemum vulgare.—In the Agestis-Artaxerxes controversy which is now being carried on in the 'Zoologist,' great stress appears to be laid on the fact that the larva of Agestis feeds on Erodium, while that of Artaxerxes feeds on Helianthemum. That the larva of Agestis does feed on Erodium is asserted principally on Zeller's evidence, as it seems Mr. Harding has made a mistake in his larvæ. It is certainly presumptuous in me to differ from Zeller, but had any one asked me, before I ever heard of this controversy, on which of the two plants I thought Agestis fed, I should not have hesitated to say Helianthemum. The facts on which I found my belief are as follow: I have taken Agestis in two places in Flintshire; the first is on a rocky limestone hill overhanging the Talargoch Mine; here Helianthemum vulgare grows in great abundance, and I am almost certain that Erodium does not occur. At Rhyl, however, which is barely four miles distant, and probably at Prestatyn also, which is only two miles and a half off, Erodium cicutarium is abundant on the sand-hills, but no Agestis is to be found. The second place is also on rocky ground, about three miles from Holywell; here again Helianthemum is abundant, but Erodium is not to be found anywhere in the neighbourhood. So closely does this insect stick to the spot where Helianthemum grows, that in an open place (about two hundred yards from the small space where it is found) which swarms with H. Hyperanthus, A. Aglaia and P. Alexis, I have never seen a single specimen: the two spots are separated by trees. In conclusion, I may add, that I am not arguing that Artaxerxes and Agestis are varieties of the same species, but merely that evidence is in favour of the larva of the latter feeding on Helianthemum vulgare.—*Alfred O. Walker; Chester, September* 12, 1858.

Double-broodedness of the Notodontidæ.—I beg to lay before those readers of the 'Zoologist' who may feel interested, the result of my experiments during the present summer and autumn with Pterostoma palpina, Notodonta dictæa and N. ziczac. It was made known through the pages of the 'Zoologist' and 'Naturalist' that I gathered sufficient larva of P. palpina and N. dictæa to lead me to hope I might obtain fertilized eggs of both species the following spring, and thus be able to supply that information as to their double-broodedness which was wanted; for I may be allowed here to remark that although this double-brooded question has been so long discussed, no one seemed to set about producing proof. The following are the results of my endeavours to supply the want of facts. On May 28 the imago of P. palpina began to emerge, and within the week every pupa produced a moth. I obtained two sets of fertilized eggs; the first batch was laid May 30 and 31, and hatched June 8 and 9; the larva buried June 27 to July 4, and the imago again emerged between July 27 and August 5. Another batch laid June 6 and 7, hatched June 14 and 15, larva buried July 10 to 17, moths emerged August 5 to 12. A small portion of the first batch was placed out of doors, and remained so throughout; the hatching and moulting scarcely varied from those in confinement; birds, spiders and storms, however, so reduced their numbers that I only got three into pupa, two of which emerged August 5; the third is still in pupa: this and subsequent experience with this and other insects, has satisfied me that mere confinement produces no effect on it whatever. The imago of N. dictæa emerged June 1, eggs were laid June 3 and 4, hatched June 12, larva buried July 13 to 19, moths emerged August 12 to 17. The larvæ of both these species were fed on growing

plants, the eggs being placed among the foliage, and not removed until after the last month preparatory to their going down. I did not this season rear N. ziczac from the egg, considering the facts produced last year to be conclusive, but Mr. Greene, in the 'Naturalist,' raises the objection that my experiments were with insects in an "abnormal" state. What has he to object to in the following? On July 17 I took twenty-two full-fed larvæ of N. ziczac, twenty of which went down immediately (two dying). One imago emerged August 12th, eleven on the 13th, three on the 14th and five on the 15th; the pupæ were out of doors most of the time: they were of course the produce of the May moth, and will be admitted to have been reared in a "normal" state. These results require no comment, they sufficiently speak for themselves. I hope the opponents of double-broodedness have also been pursuing similar researches, and are prepared to lay the results before the public, or to accept these as conclusive. I wish to draw particular attention to the following by Mr. Greene, in the 'Naturalist' of May last: alluding to Mr. Crewe's remarks, he says, "His (Mr. Crewe's) answer to my main, I may say my only, objection is not satisfactory. My objection was and is, that of the pupæ dug up even as early as the beginning of August, there is no instance on record of the perfect insect appearing from them the same year." I now produce the "instance" Mr. Greene requires, for undoubtedly those of N. ziczac might have been dug up "early in August," if I had not taken the larva just before going down; they produced the moth the "same year," without forcing, after being in the pupa state about three weeks (the duration exactly corresponding with my experiments of last year). Mr. Greene goes on to say, "I dig at poplars, oaks, elms, &c., all the year round, but I never found a pupa of either (dictæa or camelina) between the first week in June and the last in July." The reason is evident; these insects being double-brooded are in the larva state during the time mentioned, and therefore, as Mr. Greene says, not to be found in the pupa. I have taken the larva of N. dictæa in July, which produced the moth in August; I have again taken larvæ in September, which produced the perfect insect in May or June. I breed from these, again producing the moths in August, and at the time I am writing I have young larvæ of both N. dictæa and P. palpina feeding, the produce of the above, which will doubtless produce the perfect insect next spring.—*George Gascoyne; Newark, September*, 1858.

Cerura bicuspis and Acronycta Alni.—I took, on Thursday last, the 12th instant, a fine larva of C. bicuspis, and on Saturday, the 14th, the larva of A. Alni, nearly full grown; both of them appear to relish in confinement the alder, upon the leaves of which I found them. I also found, on the 12th, two Coleophora larvæ, feeding in the seed-pods of the gorse or furze. My friend, Mr. Wilkinson, says they will be C. albicosta.—*R. Cook;* 10, *Castle Crescent, Scarborough, August* 16, 1858.—'*Intelligencer.*'

Occurrence of Timandra prataria near Folkestone.—I took a good specimen of this Geometra near Folkestone the latter part of July last, but though I searched well for a week, I was unable to meet with another.—*H. Tompkins;* 44, *Guildford Street, Russell Square, London, September* 16, 1858.

Sterrha sacraria a British Insect.—There is a record of the capture of a *second* specimen of Sterrha sacraria on the wrapper of the September 'Zoologist;' I call it a *fourth* British specimen of sacraria. I possess the first, taken by Mr. Howse, near Bristol; Mr. Reading records a second, taken near Plymouth; Dr. Battersby, a third, taken near Torquay; Mr. Barrett's is, therefore, the fourth; unless some further information be given, perhaps his specimen may also be doubted.—*J. C. Dale; Glanville's Wootton, near Sherbourne, September* 13, 1858.

[I willingly supply the further information desired. Mr. Barrett is one of our most persevering and most successful searchers of the gas-lamps: one night he took a Geometra with which he was totally unacquainted; he came the next morning and described the new capture, which, as he is remarkably accurate and precise, I concluded at once to be sacraria, and told him so: the news seemed almost too good to be true; but as soon as the insect could be moved from the setting-board it was obligingly brought to this office, and I will vouch for its being a genuine sacraria. I would willingly communicate to Mr. Dale, through the 'Zoologist,' the very lamp-post that produced this treasure, but Mr. Barrett has not permitted me to do so.—*Edward Newman*].

Larva of Camptogramma gemmaria.—A lovely female of this species laid me some eggs on the 24th of July; they were oblong, flattish and yellow, but changed to a dusky brown colour on the 1st of August: the following day the larvæ hatched; at first they were very dingy, but on the 8th of August became dusky sap-green, and on the 16th assumed their characteristic markings. There were evidently two distinct varieties, one of which had the ground-colour of a greenish gray, tinged with red between the segments; the spiracular line blackish and irregularly interrupted; the back (except the last two segments) dusky, having on the intermediate segments a row of five elongated diamonds of the ground-colour, with a dusky dot in each; on the front segments these markings ran into three parallel dusky lines, while on the end segments there were four slender dusky lines arranged in a diamond pattern; the prolegs had a dusky stripe running down them. The other variety had the ground-colour of a light yellowish green, quite yellow between the segments; the spiracular line and the pattern on the back faintly indicated by dusky black lines and dots. These larvæ fed readily on groundsel (*Senecio vulgaris*), at last eating through stems bigger than themselves; but, as their frass seemed very watery, I doubt whether this is their proper food. They were quiet in their habits, resting on the under side of the leaves, hiding themselves skilfully, and could not be easily dislodged; when disturbed they curled up the front segments, but not into such a twisted knot as I have sometimes seen in more slender loopers. From the 21st to the 23rd of August the larvæ, being full fed, spun up in moss. After having been in pupa about a fortnight, the perfect insects emerged. There went down two of the green and four of the darker larvæ; there have come up again one C. fluviata (♂) and five C. gemmaria (♀)—such a narrow risk did I run of missing the solution of this problem! Solved, however, it is, and C. fluviata and C. gemmaria are hereby declared to be man and wife. I expected to find the difference of colour in the larvæ would turn out to be a sexual one; this, however, has been contradicted by the result. The pupa is brown, smooth, spiked at the tail, enclosed in a thin silken cocoon in moss. I have now seen in all about fifteen specimens of C. fluviata and six of C. gemmaria, and find that the absence in each of what were considered the distinctive markings of the other is not constant: the subapical blotch of C. fluviata may be traced more or less distinctly (sometimes quite distinctly) in C. gemmaria; while some specimens of C. fluviata have the central spot placed in the light ring, only the dark ground of C. gemmaria makes this ring shine forth much more brightly, just as a nigger's sable skin enhances the whiteness of his eyes. One of my bred specimens, having given me the slip over the edge of the table, was detected in a dark corner of the room by the white spots on the fore wings. As to the other markings, they are, line for line, precisely similar; so that the ground-colour alone remains to make the sexes look

unlike, and perhaps further breeding may sometimes upset this.—*Anon. in 'The Intelligencer.'* [The name known to me.—*E. Newman*].

Habits of Camptogramma gemmaria.—I quite agree with Mr. Gregson that C. gemmaria is a swamp insect: I have taken a fine series this season (the female is the C. gemmaria and the male the C. fluviata of Guenée's arrangement): it occurs at the Boiling Well, near Ashley Hill, and also in some meadows near here; in both instances in low swampy ground. Each of the females I took kindly supplied me with eggs, but unfortunately none of them have proved fertile, so that my expectation of being able to rear it from the egg has come to an end, at least for the present.—*G. Harding, jun.; Stapleton, Bristol, August* 27, 1858.—*'Intelligencer.'*

Camptogramma gemmaria and C. fluviata.—I have lately taken a fine series, the female being C. gemmaria, the male C. fluviata of Guenée's arrangement. I have no doubt that these insects constitute but one species, having taken two male specimens of the latter hovering over a female of the former: all the specimens I possess have occurred in low marshy places; one I took from off a willow.—*Henry Bolt; 15, Beaumont Place, Stapleton Road, Bristol, September* 14, 1858.

[I may add to these interesting communications that in the 'Synonymic List of British Lepidoptera,' by Messrs. Guenée and Doubleday, these insects stand as a single species: the list will be advertised for publication in a few days.—*Edward Newman*].

Occurrence of a Peronea new to Science at Liverpool.—I am now taking the second brood of a pretty, variable, yet distinct, little Peronea, the P. potentillana of Cooke; they feed exclusively upon the leaves of the strawberry, preferring the white-fruited varieties. On the 8th of September they were in profusion flying over the strawberry-beds; I ran for my net, leaving Mr. Almond trying to box a few; on my return the pic-nic was over, and I only secured a few "choice spirits" who did not intend to go home till "daylight did appear." On the 9th instant, which was cold and windy, I saw two; I took one and left the other to breed; on the 10th five were seen, three of them in bad condition; 11th a close evening, I was closely engaged in looking after my little favourites, everybody else spying for the comet, which everybody said was about 10 degrees high in the north-west corner of the sky, but which I did not see, for just then up got my "flee," and I secured about a dozen good ones, when the revels were over, and not another could be seen, where one minute before hundreds were on the wing!—*C. S. Gregson; Fletcher Grove, Stanley Liverpool, September* 12, 1858.—*From the 'Intelligencer.'*

Carabidæ in the Isle of Sheppey.—The result of recent excursions in this district prompts me to recommend it as a productive field to coleopterists generally and the student of the Geodephaga in particular. The main object of my first visit was the rare Stenolophus elegans, whose head quarters in the neighbourhood of Sheerness are known to an elect few. On reaching the well-known spot, which has hitherto supplied all collections, "Hope sighing fled,"—the place was completely submerged, and not a specimen could be won from the adjacent soil. Much of the neighbouring marsh land had been newly broken up by the plough, and the clods, with the surface-grass attached, had lain sufficient time to afford convenient shelter for Coleoptera, the profusion of which both surprised and interested me. In such situations I took pretty freely, together with others of lesser note, the large Hister 4-maculatus and Zabrus piger. Early in the present month I made a second visit, and after considerable effort was rewarded by the capture of eight specimens of S. elegans, which I took by the road-

side leading to Queenborough, and about half-a-mile from the spot where it was originally discovered. On turning the clods I found in company with Amara convexiuscula and a host of Harpalidæ, Anisodactylus pœciloides, of which I secured an ample supply, in all its beautiful varieties of green, purple and copper: as there is reason to suppose that no other station yields this insect so plentifully, I have deemed the record not unworthy a corner in the 'Zoologist.'—*A. Haward; Gloucester Road, Croydon, August* 23, 1858.

Calosoma Sycophanta near Bristol. — On the 30th of June last Miss Powell, of Henbury, had the good fortune to secure a perfect specimen of this magnificent beetle, conspicuous alike for its rarity and beauty; it is probable that a living specimen has never before been seen in this part of England. With the greatest liberality Miss Powell has presented me with her specimen.—*P. V. Vaughan; Redlands, Bristol.*

Proceedings of Societies.

Entomological Society.

September 6, 1858.—Dr. Gray, President, in the Chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Stettiner Entomologische Zeitung,' Nos. 4—9; presented by the Entomological Society of Stettin. The 'Zoologist' for September; by the Editor. The 'Journal of the Royal Agricultural Society of England,' Vol. xix. Part 1; by the Society. 'Journal of the Proceedings of the Linnean Society,' Vol. iii. No. 9; by the Society. 'Catalogue of the Birds in the Museum of the Hon. East India Company,' by Thomas Horsfield, M. and Ph. D., F. R. S., Keeper of the Company's Museum, and Frederic Moore, Assistant; by the Court of Directors. The 'Journal of the Society of Arts' for August; by the Society. The 'Literary Gazette' for August; by the Editor. The 'Athenæum' for August; by the Editor.

Exhibitions.

Mr. Janson exhibited, on the part of Mr. H. Squire, a box of Coleoptera, collected by him during a visit which he had just made to the Shetland Isles, and remarked, that considering the period of the year at which this trip was undertaken, his short stay of a week only, and the limited district which he had investigated (for the unpropitious state of the weather had precluded him from extending his excursions beyond three miles from Lerwick) the series now before the Meeting must be looked upon as highly satisfactory. The number of species amounts to one hundred and twenty-five, and, although the major portion of them are forms familiar to every London entomologist, still there are among them several to which he would direct the attention of the Meeting.

The first of these is apparently a species altogether new to the British list, the veritable Nebria (Carabus) nivalis of Paykull, which Drs. Kraatz and Schaum have recently shown is not identical with N. Gyllenhalli, *Schomh.*, as had been generally supposed. The specimens now under consideration differ from N. Gyllenhalli (the

ci-devant nivalis of British collections) in having a smaller thorax, which is more narrowed posteriorly; the striæ on the elytra are much shallowed, and the impressed points or punctures much more evident; and, moreover, the femora are black, the tibiæ and tarsi alone being red.

The second is a Patrobus which does not entirely correspond with the P. excavatus, *Payk.*, *Dawson*, differing in having the thorax shorter and more rounded at the sides and its sculpture coarser; it appears to agree with an insect taken by Mr. Murray in the Clova Mountains, by the Rev. Hamlet Clark in North Wales, and by Dr. Power in Lancashire. Mr. Squire, who has compared it with continental specimens of P. lapponicus, *Chand.*, in the national collection, refers it to that species.

The third is a species of Hydroporus manifestly differing from any at present in our list, and which the Rev. Hamlet Clark considers will, in all probability, prove to be the H. Lapponum of Gyllenhal.

Fourthly, Hydroporus halensis.

Fifthly, Otiorhynchus maurus.

And lastly, an Omalium, which is scarcely referrible to any of the recorded species.

Mr. Stevens exhibited a specimen of Pieris Daplidice, taken by Mr. Spencer, near the South Foreland lighthouse, on the 6th of August last.

The Rev. Hamlet Clark exhibited a box of Coleoptera, recently taken by Dr. Power in Lancashire, containing an extensive series of Bembidia, and numerous rare Staphylinidæ, &c.; also a singular monstrosity of Bembidium concinnum, having $2\frac{1}{2}$ tarsi on one of the fore legs; a specimen of Euryporus picipes, taken at Preston Marsh by Mr. Graham; and Hydroporus ferrugineus, also from Lancashire, being a new locality for that rare species. He also exhibited a specimen of Opilus univittatus, *Rossi*, a species hitherto considered peculiar to Italy, which had been sent alive in a pill-box to Mr. Baly, by a lady residing at Malvern.

Mr. Stevens exhibited a small box of insects, sent by Mr. Shield from Monte Video, containing, amongst other minute Coleoptera and Lepidoptera, a singular species allied to Claviger, found in ants' nests, and a Lithocolletis closely allied to L. lautella of Europe.

Mr. Douglas exhibited an apparently new species of Coleophora, found amongst Atriplex, at Seaford, in Sussex; also a small Heterocerus, and a Bryaxis, of which he had been unable to determine the species, found in the mud under stones in the same locality.

Mr. McLachlan exhibited an Acrobasis, new to Britain, taken at Forest Hill, which Mr. Stainton had pronounced to be A. rubrotibiella of Mann., a species hitherto only found near Vienna: it is closely allied to A. tumidella, though sufficiently distinct, as pointed out by Fischer-von-Röslerstamm in his illustrated work.

Mr. Bond exhibited four fine bred specimens of Carpocapsa saltatans, *Westw.*, with the pupa cases and seeds from which they had emerged.

Mr. Waring exhibited a singular pale variety of Pœcilocampa Populi.

Mr. Adam White exhibited the flat pupa-case of a Cebrionideous genus from North China, and remarked on the vast field of research still open to entomologists in the transformations of Coleoptera. He also communicated the following:—

"Mr F. G. Nicolay, a promising young naturalist, who lately went to St. Salvador, Brazil, sent over, within a week or two of his landing, a box containing the following

insects. The list may be not unworthy the notice of the Members, and its publication may encourage youthful entomologists to persevere, and ascend from collecting to observing transformations:—

Papilio Thoas
„ Polydamas
Heliconia Halia
Evides Dianasa
Mechanitis Lysimnia
Agraulis Vanillæ
„ Julia
Danais Gilippus
„ Archippus
Terias tenella
„ Mana
Callidryas Eubule
Ageronia Ferentina
Vanessa Lavinia
Anarta Iatrophæ
„ Amalthea
Heterochroa Cytherea
Argynnis Hegesia?
Didonis Biblis
Polyommatus and three or four Hesperiæ.

Beetles.

Phanæas Jasius (very common)
„ principalis
Cyclocephala melanocephala?"

Mr. Tegetmeier observed it was generally believed that pollen was only used as food for the larvæ of bees, and not by the perfect insects; he had, however, frequently observed bees on the alighting-board of a hive, especially in dull weather, eating the pollen from the legs of their companions as they arrived. He had continued the experiments detailed by him at the July Meeting of the Society, with a view of ascertaining the cause of the hexagonal form of the cells of the hive bee, and found that when excavating in a solid mass of wax they always formed cylinders, but on the sides of the cells approximating they invariably became hexagonal; he considered therefore that the hexagonal form resulted simply from the cells being constructed with a view to the greatest economy of space, and not from any predetermined plan on the part of the bees.

Mr. Lubbock remarked that Mr. Darwin had made similar experiments to those described by Mr. Tegetmeier, with precisely the same results.

Mr. Smith maintained the assertions made by him at the July Meeting that in wasps' nests the cells are constructed of an hexagonal form, and do not acquire it from compression or any other cause. He exhibited the nest formed by the female of Vespa vulgaris in the spring, as sufficient proof that the hexagonal form was not caused by two insects working at the same time at the formation of adjoining cells, as had been suggested to be the cause with bees; he also exhibited nests of a South American species of Polybia, and of Icaria guttatipennis, in which he observed the outside cells were as angular as those in the centre of the layers of comb, thus proving that the hexagonal form could not, in these instances, result from lateral pressure.

Dr. Gray observed that the theory of lateral pressure certainly was not applicable to the cells of wasps, as they are constructed of a material, which when once hardened never alters its form.

Mr. Downie exhibited a small observatory hive of his own invention, fixed on the top of the stock hive, and a hive, constructed by him, with an improved mode of ventilation.—*E. S.*

NATURAL-HISTORY BOOKS RECENTLY PUBLISHED.

The Aquarian Naturalist: a Manual for the Sea-side. By THOMAS RYMER JONES, F.R.S., Professor of Natural History and Comparative Anatomy in King's College, London, &c. London: John Van Voorst, Paternoster Row. 1858.

The work is most agreeably and popularly written. It contains 524 pp. fcap. 8vo., and 8 plates, printed in colours by the process called chromolithography. It treats only of salt-water objects, and a second volume by the same author is advertised as shortly to be published, similarly illustrated, intituled 'The Freshwater Series of the Aquarian Naturalist; being the Natural History of the Animal Inhabitants of our Streams and Ponds, adapted to the purposes of the Aquarium.' The price of the published work is 18*s.*

The Natural History of the Tineina. Vol. III., containing Elachista Part I., Tischeria Part I. By H. T. STAINTON, assisted by Professor ZELLER, J. W. DOUGLAS and Professor FREY. London: John Van Voorst, Paternoster Row. Paris: Deyrolle, Rue de la Monnaie, 19. Berlin: E. S. Mittler und Sohn, Zimmerstrasse 84, 85. 1858.

This volume is the third of a series, and written in four languages arranged in parallel columns,—English, French, German and Latin. It contains 270 pp., demy 8vo., and 8 plates, mostly drawn and entirely engraved by Mr. E. W. Robinson, and beautifully coloured. These plates leave nothing to be desired, and do great credit to the artists who have executed them. The price of the volume is 12*s* 6*d*.

A Catalogue of the Lepidopterous Insects in the Museum of the Hon. East India Company. By THOMAS HORSFIELD, M. and Ph.D., F.R.S., Keeper of the Company's Museum, and FREDERIC MOORE, Assistant. Vol. I. Printed by order of the Directors. London: W. H. Allen & Co., 7, Leadenhall Street. 1858.

The work is the first of a proposed series. It contains 280 pp. demy 8vo, and 18 plates, plain or coloured; these illustrate details of

metamorphosis in a manner most acceptable to the entomologist. The price is 10*s.* plain, 20*s.* coloured.

The Life of Linnæus. By Miss Brightwell, of Norwich. London: John Van Voorst, Paternoster Row. 1858.

A brief and unassuming compilation. It contains 191 pp. fcap. 12mo, and an etched frontispiece. The price is 3*s.* 6*d.*

The Proceedings of the Zoological Society of London. With illustrations. 1858. Part I., January—March; Part II., March—April. London: Longman & Co., Paternoster Row. 1858.

Part I. contains 112 pp. demy 8vo, 9 coloured plates and 1 plain. Part II. contains 134 pp. demy 8vo, 7 coloured plates and 3 plain. The plates are beautifully executed from drawings by Wolf. The price of each part is 9*s.* 6*d.*

A Cyclopædia of the Natural Sciences. By William Baird, M.D., F.L.S., British Museum, with Map and numerous Illustrations. London and Glasgow: Richard Griffin & Co., Publishers to the University of Glasgow. 1858.

This volume contains 613 pp. demy 8vo, a profusion of well-drawn and well-engraved wood-cuts, and a zoological chart, showing the distribution and range of animal life, in which the names of the carnivorous animals are printed in red and those of the herbivorous animals in blue,—a plan which catches the eye and conveys information to the mind rapidly and effectively. Between this map and the letter-press some slight discrepancies occur; thus the kangaroos or pouched rodents are coloured blue in the chart, as being herbivorous, while in the tabular view they appear as the fourth family of the order Feræ. The price of this very useful volume is 12*s.* 6*d*: it is marvellously cheap.

Bats flying in the Sunshine.—Whilst walking on Box Hill, last Sunday afternoon, the 12th inst., I was surprised to see more than a dozen very large bats on the wing, circling around with a lofty and rapid flight, like that of the great Noctule. The day was clear and warm, and, although it was nearly six o'clock, the sun was shining brightly, and the whole face of the hill was strongly illuminated, yet the bats were apparently as much at home in the sunshine as the swallows, which were sporting about in their neighbourhood, but at a respectful distance. As I believe it is unusual for the Noctule to appear so late in the season as September, or indeed for any of our bats to come out in such bright weather, I shall be glad to inquire if some one among your correspondents can tell me to which species these animals are likely to belong. I did not hear them utter any cry.—*E. W. H. Holdsworth;* 26, *Osnaburgh Street, September* 16, 1858.

Contributions towards a Biography of the Red Grouse.

By the Rev. J. C. Atkinson, M.A.

For several years past I have had continued opportunity of frequenting one of the best and most abundantly stocked moors in Yorkshire; and, partly from love of the wild freedom of the moor, and partly because the moor affords me short cuts to several different parts of a very wide and straggling parish, I have availed myself of the opportunity aforesaid at all times of the year, and, perhaps it is hardly necessary to add, much more frequently without a gun than with. It may be that some of the observations I have made on occasion of these moor rambles may not be uninteresting to some of the readers of the 'Zoologist;' and I have therefore given an hour or two to the compilation of the present paper, hoping that, though in the eyes of the savagely scientific it may take no higher rank than that of a "dish of gossip," it may yet be as acceptable to the lover of living birds as that sort of light food usually is to its customary consumers.

The red grouse, or, as they are almost universally named here, moor-bird, pairs very early. I have seen them coupled—not universally of course, but still so commonly as to be much more than simply noticeable—by the 20th or 21st of December. Last winter they had paired before the old year was out, and by the middle of January they had, almost universally, formed their annual union. But the match so early made is very often broken off, at least in appearance, under the pressure of cold and hunger. The last day, a Sunday, in January this year was a very cold day, with snow on the ground and still falling. As I went over the moor to a district of the

parish two miles distant from my residence, I saw the grouse in packs of thirty or forty each. Up to two or three days before they had been seen in pairs, and that too, as I have just said, from before the commencement of the year. I remarked to an acquaintance I met with as I descended from the moor, — "We shall get some hard weather now: I saw the grouse packed as I came across the moor." And surely the frost and snow did come, and in earnest. It was some time after this before the final pairing, that which was destined not to be again interrupted, took place; perhaps, fully three weeks. During the whole of this interval the partridges continued paired. I think it was on the 5th of February, a bitter cold day, with several inches of snow on the ground, I went down the beck, thinking it not improbable I might fall in with a duck or two. In the course of my walk I saw or came upon the traces of fourteen several pairs of partridges; and neither on that day nor on any other during the continuance of the cold weather did I see more or less than two together. Once, about a week later, while the snow was still lying thick on the ground, I saw the footmarks of three together; but I did not see the birds themselves, and should have little doubt that they were three "old bachelors."

During the pairing-time fierce fights between the male birds are of continual occurrence, and one can scarcely set foot on the moor without seeing signs of conflict. One of the most common is one cock pursuing another with eager pertinacity; and so absorbed are both in the passions of the moment that not unfrequently they cross once and again in close proximity to the spectator, in the course of their rapid wheeling flight, without appearing to heed his presence. When the spring is somewhat more advanced the grouse may be seen close to the road-side, and they are then seldom much disturbed by the passage of the traveller. Sometimes they do not take wing at all, and their flight, if they take one, is seldom to any distance. They are in full plumage at such times, and the beautiful crimson crest of the male is very conspicuous, and very fully displayed as he stands with his head up and his eye on the passer-by. The short flights of the male are also usually terminated by an upward movement of a few feet, and the utterance of his peculiar note or "crow" as he alights on some little hillock or other eminence on the surface of the water.

The number of eggs laid by the grouse is much less than in the case of the partridge. It may also be remarked that it is considerably more difficult to ascertain the number of a brood of grouse than in the case of a covey of partridges. The latter commonly all rise

together; grouse do not while still less than full-grown, and, when full-grown, seldom live or move much together as partridges in covey do. My own impression is that seven or eight young birds is more than a full average brood. Last season's hatch was an unfavourable one. * One day, about a week before the season came in, I gave an old dog of mine a run over part of the moor, and in the course of my walk I saw two broods of seven or eight, several of five or six, and a great many more of two or three. A deserted nest I walked over contained seven eggs, and I should say that a nest containing fourteen or fifteen eggs (see Yarrell, ii. 317) is very rare indeed.

The young birds, while still quite small, like the young partridge and peewit, show great readiness in concealing themselves. You may disturb a brood of little grouse, and see them "squandering," as folks say here, in all directions. The one or two you happen to have fixed your eye on, or otherwise "marked," may be picked up easily enough. The search for the others, however, except on very unfavourable ground —unfavourable, I mean, to the bird from want of roughness or cover —will most likely be baffled. They hide themselves in a marvellous way, squeeze between objects that seem to forbid all passage, worm their way amid the cover,—unless, indeed, the cause of alarm is very close to them, in which case they lie like stones, and without a dog it is in vain to think of finding them after the first minute or two of alarm and dispersion.

I have already noticed that, unlike the covey of partridges, the brood of grouse seldom rises *en masse*. Very constantly—at least after the young birds can in a degree shift for themselves by flight, but still are far short of full growth—the old cock is the first to rise. On the first sign of an intruder, whether man or dog, he appears to take the hint, and begins to beat a retreat. He runs perhaps twenty or thirty yards or more, and then takes wing, often at a very safe distance from the gun, if there be one. The hen, on the other hand, remains with her brood. She *may* rise the first, when flight becomes necessary, but just as often it is a young bird which leads the way: it seems to depend on the chance which causes either the pointer or the man to stumble on this or that particular bird. The others continue quiescent until "found" in their several turns, and unless two or three happen to be laid close together it is seldom that more than one, or possibly two, rise together. The young birds, when about

* This was written very early in July. The same remarks, however, will apply, word for word, to the present season, and to the numbers of the broods I saw in the course of one or two similar walks taken this year.

three-quarters grown, will often run a long way through the ling, and at other times, and very frequently early in the season, lie so close that it is very difficult to induce them to fly. Indeed, they are often taken up by hand to save them from the dog, who, if young, is apt to be misled by their pertinacious quiescence into giving them a nip with his jaws. When lying in this way it is no easy thing to detect them in their concealment. But all this becomes utterly changed in the course of a very few weeks. On the 27th of August, last year, I killed 15½ brace in three or four hours' shooting, in spite of indisposition so severe that I was obliged to lie down several times after discharging my gun. I might have doubled the number killed, easily. Scarcely one month later the gamekeeper, having orders to send away thirty brace within a week, was out almost daily himself for eight days, and was assisted on two days by an under-keeper and myself. On one of these two days, Sept. 22, I was out for four hours, and, having no cartridges with me, was only able to get three or four grouse. From this time to the end of the season a dog is of very little use on these moors, except for the purpose of finding a wounded bird. An old dog who will keep at heel, and not be very eager to range, is therefore all the sportsman takes; and it is but seldom he can walk within thirty yards of a grouse on the open moor. Now and then, to be sure, he may walk upon one; but if he wants to make a bag he must get birds as he can, by the use of the cartridge and by means of a species of stalking, or by "driving" the moor.

I do not think this wildness of the grouse is to be accounted for simply on the ground that the birds have been often disturbed or harassed. (See Yarr. ii. 318). This moor has been very little shot since I have known it, and some years a great proportion of the birds might scarcely hear a gun fired very near them; and yet all became equally wild every year. Indeed, this year they became very wild in August, and I believe up to the present date, Sept. 13, have never been very easily accessible. A slight and early snow sometimes has the effect of rendering it more easy to approach them, at least for a few hours; but, ordinarily, the most extreme cold, and a covering of snow a foot thick, does not appear to tame them at all. Under such circumstances they collect in enormous packs, and betake themselves to some particular part of the moor, it may be to a hill-edge, or where, from the conformation of the surface, the snow may have been driven off to a greater or less extent.

I have seen a wounded grouse dive beneath the snow, and conceal itself among the ling below. One I knew thus concealed was dis-

covered by the shooter dropping the cartridge he was proceeding to load with, and on stooping to pick it up finding it had fallen almost or quite upon the bird.

An old bird will often run a long way before taking flight, and when wounded, if not followed immediately, will run quickly and silently away to a great distance. If pursued at once, he runs awkwardly, and with a great deal of noise and disturbance, and is easily caught; unlike the partridge, whose speed is great enough to baffle even a fleet human pusurer.

Grouse frequently fly some considerable distance over the enclosures, from one part of the moor to another. I was one day walking by the beck-side, a full mile at least from the moor on either hand, when I heard the note of the grouse. Looking up, I saw two flying at a great height above me, I should think 500 or 600 feet at least. The total length of their aërial trip could not have been less than two miles. Last winter, again, I saw from fifteen to twenty fly over my premises, scarcely out of gun shot. Their flight, probably, was little less in length than in the other case.

They may constantly be seen alighting on a wall, and cackling or crowing there. I have seen this at all times of the year, but it is more frequently observable when the influence of the breeding στοργὴ is upon them. Then the cock bird, if an intruder comes near, often flies to some little eminence or a wall, if there be one near, and crows, and raises his head in watchful observation of the stranger.

It is very remarkable, about the time the general hatch draws on, how all grouse-life seems to have ceased on the moor. A few days before the observer would have seen a great number of birds, principally cocks, as he crossed the moor; now he may walk for an hour without seeing more than a bird or two. I have this year traversed certain parts of this moor for miles, and not seen half-a-dozen grouse in the course of my whole walk; while at a somewhat earlier period the same walks would have probably showed me thirty or forty pairs. The objects of such close concealment of themselves are sufficiently obvious.

Grouse do not here often descend far from the moor on to the cultivated land. They may sometimes be seen, early in the morning, in such corn-stubbles as are close upon the verge of the moor. If, however, the stubbles are on the same level as the moor, and merely separated from it by the enclosure-fence and not by any portion of intervening "bank," it is no unusual thing to see them at feed. There were one or two such stubbles in my beat last year, and I more than

once saw grouse, ringdoves and pheasants at feed in such close proximity to one another that they were quite intermingled. It is a familiar fact, which the gamekeeper often avails himself of when desired to furnish a supply of grouse late in the season, that just about daybreak they are found in some numbers, and less wild than an hour or two later in the day, close on the edge of the moor bordering on the enclosures. These officials will tell you that the moor birds are then on their return from the enclosures where they have been feeding.* If a grouse be found on the cultivated land in the day-time, it is usually a sick or wounded bird, or a greatly terrified one. I have known a grouse dash into a thick hedge fully a mile distant from the moor, and lie there to be picked up without making an attempt to escape. No signs of injury were discernible upon it, and on being liberated some hours afterwards—the next day, in point of fact—it flew away at once, and with nothing unusual in any way perceptible in its conduct. Probably it had been pursued by a hawk, and in the excess of its terror had sought the first possible means of concealment and safety that offered itself. No hawk was visible, but that might possibly be accounted for by the circumstance that the observer's attention was engrossed by the dash of the grouse and its capture quite long enough to permit the hawk to withdraw himself from inspection.

On the subject of the "grouse disease," or the "tapeworm" as it is diversely called, I have no remarks to offer. I have scarcely ever seen a bird suffering from this destructive malady on these moors, and I think I only shot one or two last year which showed signs of any disorder. A draggled tail, rusty plumage, and poor condition, tell the tale of disease very intelligibly, and a sick bird is not easily overlooked. Indeed, almost before he gets on the wing infirmity shows itself in the heavy, laborious efforts and flight of the invalid. I was told by peat-cutters and others that after the very heavy rains which fell about the middle of August, last year, a great many moor birds might be seen drowned in various parts of the moor, and they inferred that these birds had been weakened by the tapeworm. The inference might be good, but it was not altogether satisfactory. The rain was something extraordinary in its violence and duration, and the birds, if weakened at all, might have been weakened by other things save the disease, want of water for instance, under which, in

* For my own part, I doubt if they feed much before daylight, but not that they visit the enclosures at the time mentioned.

all probability, multitudes of young birds perished both last year and this.

I have seen grouse tower, and frequently. Still there seems to be a material difference between the grouse and the partridge in this respect, — a difference including two main particulars, viz., that they tower much less frequently, or, to express my meaning in a more exact manner, a much smaller proportion of the total birds killed towers, and that those that do tower do not rise to anything like the same height as the partridge. I have seen the latter bird often go up seventy or eighty or even a hundred yards, and sometimes apparently even much higher than that. I never saw a grouse, however, rise higher than, I should say, thirty or thirty-five yards. Again, I hardly ever saw ten brace of partridges killed without seeing some of them tower, and not very unfrequently I have seen both the birds killed by the successive discharge of the two barrels perform the evolution in question. On the other hand, I have often seen twelve or fifteen brace of grouse killed, and not observed a towering bird among them. This I cannot help looking upon as remarkable, as the birds of the two species are shot at under precisely similar circumstances: both rise from the ground, both fly at much the same general elevation above the ground, and in much the same sort of way; and it seems very difficult to account for the discrepancy observable between them in this particular. In the case of rooks, shot, as they usually are, with the gun almost vertical, I am not surprised that towering rarely occurs, or in the case of other birds fired at when flying so as to cause the gun pointed at them to have anything but a horizontal direction; for I feel convinced that towering is occasioned by an injury in some part, wherever that part may be, which can be but rarely reached by shot fired from much below the level at which the bird is flying. I once "towered" a partridge which was shot just as it passed over my head from behind; but it was so near to me that some of the pellets must necessarily have been driven with force sufficient to make them pass quite through the most solid parts of the bird's body.

One other peculiarity I have often noticed in the wounded grouse, viz., that it falls as if shot dead, or at all events so severely that death shall ensue almost immediately; and yet, after lying, perhaps quite motionless, during the whole time occupied in recharging, on your approaching to "bag" them they will get up and fly away as if nothing had happened. Once, last season, a bird dropped to my gun. As it did not remain motionless, but continued to work its way

along the ling, I supposed it was only winged. Just as my attendant was leaving me to pick it up, it reached a space of bare ground, took wing, flew below the little hill I stood on, and was lost. I might mention many other such instances. A partridge sometimes acts in, apparently, a somewhat similar way; but I cannot recal a single case in which I noticed it in the partridge in which I did not also notice that the bird had been wounded in the head by the discharge before which it had fallen, and was very likely blinded, at least on one side. I do not know whether this peculiarity in the ways of the grouse may not be accounted for on the ground that, being a much larger bird than the partridge, and clothed with harder and thicker plumage, a blow which would serve to disable the latter would only be sufficient to stun the former.

More facts, and more interesting in the biography of the grouse, might no doubt be collected by one who had the time at his command necessary for systematic observation. I have only tried to record what I have observed casually and from time to time.

J. C. Atkinson.

Occurrence of the Norfolk Plover and the Ruff near Barnstaple. — I have recently seen a specimen of the Norfolk plover (*Œdicnemus crepitans*), which was shot last January, on the Braunton Burrows; and I have in my possession a ruff (*Machetes pugnax*) which was shot there a winter or two back, — rather a westerly locality. — *Murray A. Mathews; Raleigh, near Barnstaple, September* 6, 1858.

[The locality is a new one for both species; but Mr. Mathews does not mention the still more remarkable fact of these birds occurring in the winter. I have always regarded them as merely summer visitors in Britain, arriving at the end of April and leaving in September.—*E. Newman.*]

Occurrence of the Spotted Crake (Gallinula porzana) *near Richmond, Yorkshire.*— A fine male specimen of the spotted crake was found dead, a few days ago, at Ellerton Abbey, a few miles from Richmond. There are, I believe, few instances of its having been observed in the North Riding of Yorkshire.—*Henry Smurthwaite; Bank, Richmond Yorkshire, September* 24, 1854.

The Red and Willow Grouse.—Mr. Gould, in a conversation about these birds, has this instant told me that the adult Lagopus Saliceti has *invariably* white wings: I am not at liberty to repeat any opinion Mr. Gould may have offered as to the distinctness of the two supposed species; but this mere matter of fact he permits me to use as I please: prior to attaining adult plumage the young birds' wings are coloured similarly in both grouse.—*Edward Newman; September* 27, 1858.

The Red and Willow Grouse. — I have no hesitation in saying that I think the willow grouse quite distinct from the common grouse. The short thick bill, stouter tarsi, and white wings, are quite sufficient to distinguish the willow from the common

grouse. The eggs I have seen of the willow grouse are also quite different from those of our common bird. — *Frederick Bond; 24, Cavendish Road, October* 11, 1858.

The Red and Willow Grouse.—The question mooted by Mr. Norman regarding the identity of these two (so-called) species is undoubtedly very interesting, and I trust the subject will receive the attention it deserves, and be thoroughly worked out by those who have had the fullest opportunities of making the necessary comparison. I have no wish or intention of putting forward my own opinion on the matter, nor will I venture to express my crude thoughts on a subject, with the positive facts of which I can speak with so little accuracy; but perhaps I may be permitted to state one particular, which came under my notice in the year 1850, when I shot the willow grouse in Norway in considerable numbers, and which, in fact, for a certain period formed the principal item in our daily bill of fare; for it struck me at the time as something remarkable that whereas all the old birds which passed through my hands had white wings, the young and the half-grown birds as invariably had their wing-feathers coloured: moreover, I now possess, amongst the many skins of these birds which I brought home to England, several immature specimens of every age and size, from the chick lately emerged from the shell, which I caught with my hands among the rocks on the Fjeld, up to the full-grown adult; and I have now before me a case of these birds, old and young, the latter of which, up to the point when they are about three-parts grown, show no white whatever in their wings, the quill-feathers being invariably coloured, whereas the older birds, as well as the adult, have invariably white wings. This fact I recollect pointing out to my friend Mr. Alfred Newton, in 1852, since which time that gentleman has made his own observations on the same point in Norway and Lapland; and if he could be prevailed on to state the result of his experience on the point, I know of no one more entitled to be listened to with attention, or more likely to arrive at an accurate conclusion on the point in debate. As regards the size of their respective beaks, I have nothing to offer beyond my impression that the beak of the willow grouse is not larger or stronger than that of the red grouse, though here I speak with considerable hesitation, not having a specimen of the red grouse at hand with which to compare my Norwegian birds. But again, in discussions of this kind, regarding the identity of supposed species, one very tangible point is the comparison of a sufficient series of their respective eggs, as suggested by Mr. Norman in his former paper (Zool. 6209), and surely this must be a matter of no difficulty, when we consider the numerical abundance of both birds: I regret that I did not bring home from Norway specimens of the egg of the willow grouse, but I doubt not many others must have done so, and I trust that some one who has the opportunity will communicate this strong argument for or against the verdict of identity; for I conceive that in a dispute of personal identity (notoriously a subject which, above all others, puzzles judges and juries and the whole bar), whereas on the one side a perfect similarity of eggs would be a great link in the chain of evidence for the identity of the supposed species, on the other hand an uniform dissimilarity of eggs would at once prove an insurmountable barrier against such identity. I therefore repeat that I trust this comparison will be instituted, and the result made known, while the question is pending; and I earnestly hope that the whole very interesting inquiry will not be suffered to drop till it has been thoroughly investigated, and the advocates for both sides fully heard. — *Alfred Charles Smith; Yatesbury Rectory, Wilts, October* 12, 1858.

Red and Willow Grouse.—I am much pleased to find that Mr. Newman invites (Zool. 6243) Messrs. Doubleday, Bond, Salmon and Wolley to give their views on the identity of our red with the willow grouse; by this means the question will stand a good chance of being thoroughly investigated, and an ornithological question of the very highest interest solved. Since my last communication appearing in the 'Zoologist' I have received a private letter from a correspondent, who writes as follows, touching the colour of the wings, &c.:—"I have examined many of these birds (willow grouse) killed in summer, and have found that although the wings are, as you describe them, more or less of a 'tawny brown,' yet the quills are invariably white, and the reason appears to me pretty plain: these quills are moulted but once a year, while nearly all the rest of the feathers are changed twice, if not three times." The same gentleman also states that he has compared the bills of the red grouse with those of the willow grouse, and that larger bills were by no means constant to the latter; indeed he found an old male red grouse with a larger bill than that of our old male willow grouse, which had the longest of the series. These facts, coming from a gentleman of much experience in the matter, I look upon as being of great value. At any rate, it appears I have been in error in describing the colour of the wings of those I flushed in the Dovrefjelds; still I cannot understand how the wings should appear brown, if the quill-feathers were white; the vibrations of the wings during flight would scarcely account for the appearance.—*G. Norman: Hull, October* 15, 1858.

Occurrence of the Marsh Harrier on Pevensey Levels.—Mr. Albert Vidley, of this town, shot on Saturday, October 2nd, in Pevensey Marshes, a remarkably fine specimen of the marsh harrier (*Falco æruginosus*); it was in very fine plumage. The crop was very much distended with the remains of a bird, apparently a moorhen. Mr. V. says he has often seen them in the Marshes, but never shot one before. The same indefatigable naturalist brought me to-day, for inspection, a fine lesser blackbacked gull (*Larus fuscus*), shot by one of his father's men, the day before, in Pevensey Bay. —*John Dutton; South Street, Eastbourne, October* 12, 1858.

Occurrence of the Spoonbill near Aldborough.— A white spoonbill (*Platalea leucorodia*) was shot at Thorpe Mere, near Aldborough, Suffolk, on the 29th of September: it is a young bird; it measures 36 inches in length, and the bill is 8½ inches in length; the crest on the head is wanting; the upper plumage is dull white; the shafts of the feathers and margins dusky brown, with the shafts and tips of the quill-feathers black. This is the first occurrence of the spoonbill in this neighbourhood for several years: one was shot on the same marsh in 1848; I am not aware of any since.—*Edward Neave; Leiston, near Saxmundham, Suffolk.*

Occurrence of the Wood Sandpiper near Birmingham.—A specimen of the wood sandpiper (*Totanus glareola*) was shot a few miles from Birmingham (at Barr), on the 26th of August: the bird is a male, and was, by the gentleman who shot it, presented to Mr. Charles B. Hodgson, of this town, in whose possession it now is. I am not aware that this bird has before been observed in this district.—*Henry Buckley; Church Road, Edgbaston, Birmingham, October* 15, 1858.

Occurrence of the Glossy Ibis in Dorsetshire.—One day last week a boatman shot, in the immediate neighbourhood of Wareham, in the meadows opposite the Priory, a specimen of the glossy ibis (*Tantalus falcinellus*, Penn.): it has been purchased by C. O. Bartlett, Esq., of Wareham, and is now in the hands of Mr. Hart, of Christchurch, for preservation. It will be remembered that Yarrell records one killed in

Poole Harbour in 1839: Wareham is situated at the head of Poole Bay.—*William Thompson; Weymouth, October* 5, 1858.

Occurrence of the Pomarine Skua (Lestris pomarina) *at the Land's End.*—This species of skua has appeared with us frequently, but in some seasons they are more abundant than in others. Generally their plumage exhibits an uniform brown tint, more or less edged with reddish brown, according to the age of the bird. I have just examined a very perfect specimen of an adult bird, killed within the last few days at the Land's End. The crown and sides of the head and the whole of the upper parts are of a deep uniform bluish black; the back of the neck, throat, upper parts and sides of the neck white, striated with yellow; the breast, sides and belly to the vent pure white, a few indistinct spots of brown disturbing this colour on the sides of the breast; the vent and under tail-coverts dark brown. The two middle tail-feathers were unfortunately lost.—*Edward Hearle Rodd; Penzance, October* 16, 1858.

Note on a Bird and on a Quadruped, both found in Natal, and both said to prey upon Serpents. By John Henry Gurney, Esq., M.P.

The following extract from a letter, which I have recently received from Natal, may perhaps interest the readers of the 'Zoologist.' The bird referred to would appear by the description to be the Abou-Gamba of Abyssinia (*Bucorvus Abyssinicus*); the quadruped may probably be a species of Ichneumon.

The letter from which the extract is taken is written by Mr. Thomas Ayres, of D'Urban, Natal, a collector from whom I have received much curious information and several very good ornithological specimens, well prepared, and at moderate prices, and whom I can therefore recommend to the notice of any naturalists requiring specimens from the Colony of Natal.

J. H. Gurney.

Catton Hall, Norwich,
October 7, 1858.

"That which follows with regard to the habits of the undermentioned bird is on Caffre authority, which I consider very good.

"This bird I have forgotten to mention before, but I daresay you are acquainted with it; it is generally called here the Turkey buzzard (a misnomer I have no doubt), from its resemblance to a turkey; some call it the snake bird, because it lives entirely on snakes and other reptiles: it is the size of a large turkey; general plumage black, with a large patch of white on the wing; the front of the neck is bare of

feathers; the skin hangs down, and is of a bright red colour, similar to that of the turkey; the bill is about nine inches long and black, is curved, sharp-pointed and large, similar to the stork's, and has a knob, or is larger at the top near the head, similar to some of the horn-bills; the legs are short, but this bird jumps so quickly and so far that, if only winged, it is almost impossible to catch him on foot. Their habits are somewhat curious; they generally hunt in company from four to eight or ten together, feed almost entirely on snakes, and do not hesitate to attack those of the largest and most venomous kinds in the following manner: on discovering a large snake three or four of the birds advance sideways towards it, with their wings stretched out; with the quill-feathers they flap and irritate the snake till he seizes them by the wing-feathers, when they immediately all close and give him a violent peck with their long and sharp bills, immediately withdrawing again, when the snake leaves his hold; this they repeat till the snake is dead; if the reptile advances on them they place both wings in front of them completely covering their heads and most vulnerable parts.

"There is also a small animal here, something like a polecat, which kills large venomous snakes (some eight to twelve feet long) in a curious manner: when he finds the reptile has left his hole he enters and awaits its return; the instant the snake puts its head in, the cat seizes him by the upper part of the neck, not leaving his hold till the snake is dead: he then bites the snake into many pieces, laying them together carefully in a heap, but seldom eats them: he then struts about with hair erect, seemingly much pleased with the feat he has accomplished.

"I have perfect confidence in what the Caffres tell me, as they have every opportunity of seeing and knowing the habits of many animals and birds; but of course when my information is from them I shall tell you."

Occurrence of Rare Birds near Banff. By Thomas Edward.

A specimen of the spoonbill (*Platalea leucorodia*) was seen near this place last spring: it frequented the same spot for nearly three weeks.

During the past summer a specimen of the bee-eater (*Merops apiaster*) was observed by three different individuals at a place called the Hills of Boyndie, about two miles from Banff.

Three specimens of the curlew sandpiper (*Tringa subarquata*) were seen to frequent a part of our coast for several days towards the end of August last: one, a male, a very fine specimen, was procured.

A hoopoe (*Upupa epops*) was shot by the Duke of Richmond in Glen Fiddoch, one of his Grace's deer forests, on the 21st of September.

Four bartailed godwits (*Limosa rufa*) were seen about six weeks ago.

A specimen of the brown snipe (*Scolopax grisea*) was met with on our sands on Saturday afternoon, the 25th of September. When first observed it was feeding amongst some dunlins and ringed dotterells: there were also a few golden plovers. It is rather a rare circumstance to see these birds on our coast at this season of the year; but confound these ringed dotterells,—they are almost as bad as the curlews; for there is no getting an easy shot at a stranger when once it gets associated with them: they are eternally on the look out for squalls, and when anything does appear they generally alarm everything near them. A shot, however, after a good deal of winding and turning, was fired, and although at pretty long range, broke at least one of the snipe's legs; this had the effect of parting him from his companions, as they all flew seaward, and he to a ride of shingle which intervenes between the sands and links. Here he alighted or rather fell, for he tumbled as he came down, seemingly to rise no more. Having reloaded, in case of need, I then ran, as well as I was able, to pick him up, gained the spot, and after a little trouble found my bird stretched out at full length amongst the pebbles,—a corpse, as I thought. And what a most beautiful specimen he was!—apparently an old bird. It was now that I was made fully aware of what I had really shot at, and what a valuable prize I had got, or rather met with. I laid down my gun, and sat down myself, being almost intoxicated with delight, and having taken some cotton wadding from my pocket to wrap round the injured leg and stop up any other wound he may have received, I took him up for that purpose; but, alas! too sanguine fool that I was to lay my gun aside so soon. It is a true saying that "there's many a slip 'twixt the cup and the lip:" I have experienced it often, and here I was doomed to it again. Away flew the bird, having actually slipped through my very fingers, whilst about to lay him on my knee. I looked, but what like I really cannot tell; but what was the use of looking? What else could I do? Well, I fired both barrels as soon as I got hold of my gun, and sitting as I was too. But what of that?

Why I was just in the very nick of time to be too late. Away went the bird, his shattered limb dangling the while, and whistling as he flew, but whether in derision of my stupidity, or exulting in his own most miraculous and fortunate escape, I know not. One thing, however, I observed,—that his whistling was not unlike the call of the redshank (*Totanus calidris*) when suddenly disturbed. Having flown about a hundred yards or so, he again settled amongst some low-lying rocks. I was in doubt as to whether I should follow: it was now gloming, and betwixt my own weakness and anxiety I was more like an aspen leaf than anything else. Follow, however, I did, having first reloaded, and was just about giving up the pursuit as hopeless, when he rose from beneath my feet. Both barrels were again emptied, but with little apparent effect: the last made him scream somewhat harshly and falter for a little in his flight, but that was all. Darkness now put an end to any further operations for that night, and caused me to return home a much disappointed and rather sorrowful being. Next day, however, and for many days afterwards, I was again out; but although the coast has been searched for miles on either side of the place where the bird was last seen, no traces of him can be obtained; and thus it may be said has been lost one of the greatest ornithological rarities which has visited us this many a day, for doubtless he has died of his wounds, and will rot unheeded in some hidden and unknown spot. I am not aware that this species was ever met with here before.

THOMAS EDWARD.

Banff, September 28, 1858.

Migratory Birds in the Isle of Wight.—The following dates were observed this year at Bembridge:—

SUMMER BIRDS FIRST SEEN.

March 24. Wheatear (20th at Sandown); Chiffchaff. Wind E., light.
April 1. Swallow. Wind N.E., cold.
„ 6. Swallows (several).
„ 9. Redstart, Willow Wren, Whitethroat, Cuckoo, Blackcap. Wind E.N.E., cold.
„ 10. Titlarks (numerous), Nightingale, Yellow Wagtail. Wind S.E.
April 13. Sandwich Tern. Wind S.E.
„ 14. Sand Martin. Wind S.E.
„ 16. Wryneck.
„ 20. Whinchat.
„ 30. Swift.
May 4. Turtle Dove.
„ 5! House Martin.
„ 6. Common Sandpiper.
„ 6 to 8. Flycatcher.
„ 11. Grasshopper Warbler.

WINTER BIRDS LAST SEEN.

April 1. Turnstone.
„ 13. Brent Goose.
„ 17. Black Scoter.
„ 26. Tufted Duck.
„ 27. Redthroated Diver (several).
„ 28. Great Northern Diver.
May 4. Greenshank.
„ 12. Curlew.
„ 11 to 13. Bartailed Godwit.
„ 15. Whimbrel.
„ 30. Gray Plover, Dunlin.

The remarkable features of the above list seem to be the early date of the beginning of the migratory movement, and the great numbers of certain species among these early arrivals; for instance, the swallow and sand martin were reported in the 'Times' newspaper to have been seen at Dorchester on the 31st of March, and the 1st of April is an equally unusual date in the Isle of Wight. At Bembridge, on the afternoon of the 9th of April, the bushes along the sea-shore were literally swarming with small warblers, principally willow wrens; while redstarts, generally quite uncommon birds with us, were so abundant for a week all over the island as to have attracted the notice of the least observant. May not these birds have been driven from their intended course by the severe weather which then prevailed in the interior part of the Continent? If at least they were a detachment that should have dispersed itself over France and Germany, but upon this occasion preferred a more westerly route, within the influence of the milder temperature of the sea-coast, this might serve to account for the few days difference in the date of their arrival with us. The pause which afterwards ensued before the coming of the main body of birds was equally striking. After the first pioneers had left us (as they did within a week) it was long before their place was filled by fresh arrivals, and swallows did not, in the Isle of Wight, become plentiful until nearly the middle of May. Coincident with this unusual lateness of the main body of swallows was the visit of a flock of bartailed godwits that was first noticed on the 11th of May, and remained on our mud flats for several days: as far as was observed, only three of the number had yet assumed the bright bay colour; one of those that I shot was in perfect summer plumage, and two or three stragglers met with in Sandown Bay had also very nearly or quite completed their moult; these red birds were all found to belong to the male sex. The gray plover seen on the 30th of May was perfectly black beneath, being quite similar to another solitary individual of the same species obtained last year, on the 8th of May.—*A. G. More; October* 5, 1858.

Occurrence of the Short Sun-fish (Orthagoriscus Mola) *near Banff.*—A specimen of this rather rare and somewhat singular-looking creature was captured, on Monday last, by a boat's crew belonging to Whitehills, one of our fishing villages: it was found floating on the surface, seemingly in a state of repose, and suffered itself to be taken on board in that condition. After it was in the boat, however, it began to show life, and floundered about dreadfully, much to the annoyance of the fishermen, who were somewhat afraid of it, on account of its odd appearance, never having seen anything of the kind before. Amongst several parasites (Crustaceous) found upon it, are three specimens of Tristoma coccineum; and, from the gills, no fewer than nineteen female Cecrops Latreillii were taken, and each, except three, had a male attached; some of the females were more than an inch in length, whilst some of the males were not above an eighth of that length: so peculiarly and firmly attached are the males of this

species to the females, and so like a portion of their own bodies, that it would be no difficult matter to mistake the two for one: there were no males found, but those on the females. A monster "Carldadie," as we call it here, or ribwort plantain (*Plantago lanceolata*),—a somewhat strange and peculiar-looking specimen of this common plant,—was met with lately near Banff: it is a well-known fact, for almost every child knows it, that this plant is single-flowered, and that the flower-stalk grows up entirely destitute of leaves, these adhering solely to the root: in this case, however, it was different, there being no fewer than thirteen leaves and three flowers on the top of a single stem: the stem was nineteen inches in height, and very stout.—*Thomas Edward; Banff, October* 8, 1858.

Occurrence of the Immaculate Wrasse at Weymouth.—I have to record the capture of a specimen of the immaculate wrasse (*Labrus carneus*, of Bloch): it was taken by my relation, Mr. Edward Kynaston, whilst fishing with me at the back of the Portland Breakwater, on the 27th of September last: we were fishing for whiting pout, with shrimps for bait. This is the second specimen that has occurred to me; the other, which was also obtained in Weymouth Bay, I recorded on the 10th of October, 1853. The specimen last obtained I have preserved in spirits, and have deposited in the Weymouth Museum.—*William Thompson; Weymouth, October* 5, 1858.

The Loves of the Slugs (Limax cinereus).—I know not whether you may remember that, about fourteen or fifteen years ago, having observed (as I then thought) a most anomalous method of copulation with some of the Limaces (Limax cinereus), I inquired if you could inform me of any work in which it was described, it being so very singular that I hesitated to send you a description of it; but having had this summer some opportunities of observing it again, and verifying my former notes, it seems that it is the normal mode of copulation, with that species at least. I now forward it to you for insertion in the 'Zoologist.' In the supplementary part of Cuvier's 'Animal Kingdom' (Griffith's edition), vol. xii., Mollusca, p. 325, it is stated, "Their general activity increases according to the temperature. It is generally about the end of spring and in summer that they seek each other for the purpose of reproduction. We know but little respecting the particulars of their intercourse. They are hermaphrodites, and give and receive impregnation at the same time. The organs of generation are situated near the neck. * * A very short time after intercourse, and generally in the month of May or June the Limaces lay eggs." Towards midnight, in the close, sultry summer nights, from June to September, a couple of Limaces may be observed slowly following each other, with the mouth of the second resting on the tip of the tail of the first, as it may be termed (the extreme point of the foot). I have not been able to ascertain whether it takes hold of the tip with its mouth, or merely rests upon it, but from the equable motion of the two I should expect the former was the case, the second following every sinuosity of the tortuous course taken by the first, without the least deviation, for a considerable time (I watched one pair upwards of a quarter of an hour without any alteration in their relative positions); they then ascend some wall, or other perpendicular surface near where they happen to be; when they finally stop the second crawls up alongside the first; they then crawl around each other circularly, during which time they emit a large quantity of mucus, which forms a patch two inches to two and a half inches in diameter: as soon as the mucus

has acquired a sufficient consistence, they begin to twist around each other, and detach themselves from the wall,* hanging only by a cord formed of the thickened mucus; as they hang suspended, they still keep twisting themselves around each other, forming a double spiral; they continue this turning motion ten minutes or more, until at last their bodies can hardly be distinguished from each other, thus forming a regular cone about two inches in length and the base one or two inches in diameter, hanging from its apex; during this time the mucous cord keeps lengthening slowly (in one instance it reached about fifteen inches in length; I have not seen any less than eight or nine inches); the organs of generation are then protruded from their orifice near the mouth, and, hanging down a short distance, touch each other; they then commence the same spiral motion, twisting round each other, resembling a two-stranded cord. When fully protruded they cannot be distinguished; the lower part then assumes various forms: the first I saw resembled an inverted flat-topped agaric, the portion forming the stem being about two inches in length and two or three lines in diameter, the top being about an inch and a half across: others have formed an ovoid mass suspended in like manner, covered with foliated processes similar to those of a foliated Murex or a leaf of curled parsley; at this time they form a very beautiful object, especially when they hang from some projecting surface, which enables them to swing clear without touching the wall; the dark shell-like substance hanging pendant from a white shining cord, one line in thickness, below which hangs another white semi-transparent body, the delicately striated surface of which shows all over it; a continuous vermicular motion; the foliated expansions, continually changing their form or being withdrawn in places and shooting out afresh in others, giving out occasionally an iridescence, as the light falls upon the ever-varying surface. After remaining a considerable time in this position (the vermicular motion continuing without intermission) the generative organs separate, and when nearly withdrawn, the bodies untwist themselves and separate; they then crawl up the suspending line and depart. I suppose the reason why they have not been previously observed is, that it always takes place late at night: I have never observed them before eleven o'clock, but generally about midnight. If persons observe, where the slugs abound, circular patches of slime on the walls, formed during the previous nights (being so much more in thickness than the shining tracks they make, they are not obliterated for two or three days), they may be sure that by attentively observing them the next sultry nights, they will most probably be able to verify the foregoing statement of facts.—*James Bladon; Pont-y-pool, September* 30, 1858.

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* I have not been able to observe the actual separation from the wall, my attention being unfortunately called off for a minute or two from them; in the case in which I had an opportunity of tracing the whole process from commencement to end, I left them when they were forming the circular patch of mucus, and when I returned they had just left the wall and were commencing the secretion of the suspending cord.

Notes on two Crustacea new to Britain. By J. R. Kinahan, M.D., Secretary to the Dublin Natural-History Society.

Platyarthrus Hoffmanseggii, *Brandt.*

On the third of last month I received from my friend the Rev. A. R. Hogan, a letter containing specimens of an Oniscoid, found by him in ant-hills of Formica rufa and allied species, near Weymouth, and which has been up to this time unnoticed in Britain, and but meagrely described on the Continent.

The curious companionship of Isopod Crustacea and Ants was, I believe, noticed for the first time by M. H. Lucas, in the case of an Oniscoid found by him at Medeah, in Algeria, in company with Formica testaceo-pilosa, and which he has recorded under the name of Porcellio myrmecophilus, in a paper in the 'Revue et Magasin de Zoologie,' p. 335, 1855, intituled "Observations sur deux Nouveaux Genres de Coleoptères (Oochrotus et Merophysia) qui vivent dans les four milières des Formica barbara et testaceo-pilosa." I may remark, in passing, that a careful examination of type-specimens of this species, kindly afforded me by the discoverer, has satisfied me that it does not belong to Porcellio as restricted by Brandt; and I have therefore, with M. Lucas's permission, established a genus Lucasius for it, and hope shortly to describe it more fully as Lucasius myrmecophilus, along with a number of new and undescribed genera of the group.

The Isopod sent me by Mr. Hogan proves to belong to the genus Platyarthrus, established by Brandt in his 'Conspectus Monographia Oniscodorum,' and is probably identical with the species, P. Hoffmanseggii, *Br.*, there noted by name only (which is, I believe, identical with Itea crassicornis, *Koch.*), as M. Lucas kindly gave me, when in Paris, specimens identical with Mr. Hogan's, which he had obtained in abundance in the ant-hills of Formica rufa, at Fontainbleau, near Paris, and which is therefore most probably identical with the species found by Brandt in Germany.

The following descriptions have been drawn up from the specimens:—

Genus Platyarthrus, *Brandt.*

Body flattened. Head transverse; lateral and frontal lobes well marked, arising from third ring. Internal antennæ inconspicuous, three-jointed. External antennæ seven-jointed. Peduncle,—second joint lobed internally; fifth broad and flattened (whence

name of genus). Filament two-jointed; basal joint minute, rounded, nearly concealed by fifth joint of peduncle; terminal joint rounded and scabrous (Brandt failed to perceive the basal joint, and hence misdescribed the antennæ as six-jointed). Abdominal rings,—coxæ of first and second obsolete. Telson (terminal ring),—coxa obsolete, triangular. Posterior pleopods articulated to inferior margin of telson. Peduncle completely exposed. Accessory lobe well marked. Accessory appendage rounded. Ischium flattened, trigonal.

Species Platyarthrus Hoffmanseggii, *Brandt.*

Cephalothorax and abdomen covered with numerous rounded granules, the margins of the wings distinctly crenulated through them. Frontal lobe of head arched, fringed with coarse hairs, extending over the entire front. External antennæ densely scabrous and tuberculated. Eyes small, situated at external angle of head. Telson triangular, with a shallow pit above its margins, slightly excavate; posterior margin fringed with hairs and tubercles. Last pair of appendages,—peduncle subrotund, sides parallel, its superior margin distinctly crenulated, scabrous. Accessory lobe arising from inferior margin of peduncle. Accessory appendage curved and rounded, barely attaining to apex of peduncle. Ischium scabrous, terminating in a filament, equalling the peduncle in length.

The specimens sent were all whitish gray. Mr. Hogan states that the species is very active, does not roll, but merely feigns death when alarmed, and conceals itself very rapidly.

Crangon Pattersonii.

During some dredging researches in Belfast Lough, last August, an undescribed species of shrimp occurred to me, which I wish to record under the above name.

Rostrum nearly as long as the eyes, rounded at end, concave above. Carapace with three rows of spines, viz., one median of three spines, and one on each branchial region which bifurcates as it passes upwards. Abdominal rings,—first to fourth smooth; posterior margin of fifth ring produced medianly into a triangular knob; sixth ring flattened above; telson (last ring) lanceolate, sulcated above; the fourth to sixth rings narrow suddenly, as in C. fasciatus.

The species is closely allied to C. spinosus, which differs in having a narrow rostrum acute at end, and the rings of the abdomen from the first to the fifth carinated. These distinctions hold good even in small specimens. The specimens obtained were male and female, the latter

with ova; they occurred in from ten to fifteen fathoms, in black sand, in the same locality. Crangon Allmanni and Crangon spinosus also occurred. I have named it after Robert Patterson, M.R.I.A., President of the Belfast Natural History Society.

JOHN ROBERT KINAHAN.

Seaview Terrace, Donnybrook,
October 11, 1858.

Occurrence of Vanessa Antiopa in the North.— A fine specimen of the Vanessa Antiopa was seen in my garden at Blackwell, near Darlington, the end of last month (August), and a local paper mentions that one was caught not far from Guisborough, about the same time. I have heard of others which have been lately captured or seen in different parts of this county, as well as in Yorkshire. This butterfly is only an occasional and rare visitor to our county (Durham). The 'Zoologist' for 1848 contains a notice of a pair taken at Bishop Auckland that year, and I possess a specimen which was found many years ago floating on the river Tees. While on the subject of this insect I wish to correct the observation of a correspondent in the 'Zoologist' for 1843, that the white-bordered Antiopa is not found in Switzerland. I have myself met with both kinds, the white and yellow-bordered, in that country. Since I last wrote I have received a specimen of the Vanessa Antiopa, taken on the 20th inst., in my garden at Blackwell: it would be curious if it could be proved to be the same that was seen there nearly a month ago.—*John Church Backhouse; Blackwell, near Darlington, September* 21, 1858.

Occurrence of Colias Edusa at Darlington.—A male of the Colias Edusa was taken a few days ago at Darlington, a butterfly by no means common with us, even in those seasons when it is thought most to abound.—*Id.*

Larva of Erebia Blandina.—This year, for the first time, I have succeeded in obtaining a few eggs, which hatched about fourteen days after they were deposited, and the larvæ are now [October] feeding freely on several species of Poa. They have undergone their second moult, and may be described as pale green, with a dark green or brownish stripe down the back, and two white ones, narrowly bordered by the same dark colour, on each side. In the lower white stripe on each side are the spiracles. The posterior extremity is attenuated and slightly furcate, as in the other larvæ of the family.—*George Wailes, in a Catalogue of the Lepidoptera of Northumberland and Durham*, p. 11.

Larva of Erebia Cassiope.—Pale green, with numerous darker green longitudinal lines shaded into the ground-colour, and with a well-defined white line along each side in the region of the spiracles. The larvæ feed upon Poa annua and Festuca ovina, though I suspect, in a state of nature, they live on the young leaves of Nardus stricta or some of the smaller Junci which constitute the principal herbage of the mountain sides where the insect is met with.—*Id.*, p. 12.

Larva of Satyrus Semele.— Duponchel states that the larva of Satyrus Semele does not suspend itself after the usual manner of the Satyridæ, but excavates a little hole in the ground, in which it undergoes its metamorphosis after the manner of a Noctua. Mr. Logan has verified this observation.—*E. Newman.*

Polyommatus Artaxerxes and Agestis.—I think it is due to the readers of the

'Zoologist' that they should be made fully aware of the grounds upon which Polyommatus Agestis and Artaxerxes are considered one species, as there seems to be still a considerable amount of scepticism upon the subject: I must beg leave, therefore, to recapitulate a little. In the first place, there is no appreciable difference either in structure or markings; the differences being absolutely limited to the colour of the discoidal spot on the upper side, and the greater or less distinctness of the pupils to the ocelli beneath. Every good naturalist knows that colour, unaccompanied by difference of structure or marking, is of very little value in the discrimination of species; and if we admit it in this instance, we must also consider the Scotch variety of Cœnonympha Davus as a distinct species, along with many other Scotch insects which differ in colour from the same species as found in the South of England. Secondly, the description of the larva of Agestis will serve also for that of Artaxerxes or *vice versâ*. Although I have not yet seen the larva of Agestis alive (the larvæ forwarded by Mr. Harding having been those of Hypera fasciculata, and one true Agestis larva which Mr. Doubleday kindly sent me having produced several Microgaster cocoons on its way here), I have seen a beautiful drawing of the larva of Agestis by Mr. Standish, which Mr. Doubleday kindly sent me; and, as far as one can judge from a drawing, the two larvæ are the same. Again, the larva of Agestis can no longer be said to feed exclusively on Erodium, if indeed this is its usual food-plant, Mr. Gregson having found it on Helianthemum, which, added to the obesrvations of Mr. Walker (Zool. 6248), leaves no room to doubt that Agestis is at least as much attached to Helianthemum vulgare as it is to Erodium cicutarium. The habits of the two with respect to pupation are also essentially the same; as though Artaxerxes when near the base of a rock, or when confined in a box, sometimes fastens its pupa by a silken thread across the body, it does not always do so, and the pupa is frequently found on or in the earth beneath the plants. Although a matter of secondary importance, I may mention that the little white cocoons of Microgaster from the Agestis larva belong apparently to the same species as that which infests the larva of Artaxerxes. Mr. Crewe says that he is "an utter unbeliever in what are called permanent varieties or races." He surely does not mean this to apply to the whole of nature; and if we have permanent races in the human species, in many of the higher animals, and in other orders of insects, I do not see why they should not exist also among the Lepidoptera. The conviction that they do so exist is becoming every year more strong with me; and I believe that not only are modifications in colour, size, &c., frequently hereditary, but also variations in habits; and this in cases where there can be no reason to doubt the identity of the species, or to suppose that the facts tend to support the theories of Lamarck. — *R. F. Logan; Duddingston, Edinburgh, October* 13, 1858.

[Is not the supposition that Polyommatus Agestis feeds on Erodium a mere mistake, arising from an individual larva having accidentally been found by Professor Zeller wandering from its food-plant?—*E. Newman.*]

Polyommatus Artaxerxes and Agestis.—When I wrote a reply to Mr. Logan's paper, in the June number of the 'Zoologist,' I hoped that it would have produced some fact to prove that the two species were one and the same, but it appears that those parties have no fact to produce. Mr. Newman certainly has made a mountain of a mole-hill regarding my mistake, and has it seems quite forgotten the main question,—are the two species one and the same? Yes, says Mr. Newman, I had that opinion twenty-five years ago; and it appears that since that period he has not taken one step

in advance in this matter; at all events he has not told me of any. I should have been much pleased if Mr. Doubleday had given us his opinion, for he received some of the larvæ of P. Agestis from me; but again, Mr. Newman states that I leave untouched the evidence of the present year. In answer to this, I state that I have no fresh evidence; the larvæ are the same, their food-plant is the same, and their manner of feeding is as it was eight years ago. I expected to have the evidence of Mr. Newman and others to prove that they were one and the same, but it now appears that time, that great unfolder of events, must decide the question. One word before closing this subject, to Mr. Harpur Crewe; he says he knows nothing of the larva of P. Agestis, but thinks it ought to revel on the top of its food, as its brother P. Argiolus does, and is at a loss to conceive why I have condemned it to so hard a fate. I hereby inform Mr. Harpur Crewe that I had no hand in the matter, any more than he had in condemning P. Argiolus to be exposed on the top of a holly-tree when its brother was snugly ensconced under its food-plant; but it is such circumstances as these that prove a difference of species. One word more: I hope that this subject will set others on the look-out for the larvæ of P. Agestis; by this means we may arrive at the truth.—*H. J. Harding;* 1, *York Street, Bethnal Green, October* 14, 1858.

The Distinctive Differences between Polyommatus Agestis and P. Artaxerxes carefully considered. By G. Wailes, Esq.*

Let us now consider the points of distinction relied on. They seem to be,—*first*, the marginal band of orange spots; *secondly*, the black or white spot in the upper wings; and, *thirdly*, the ocellated or non-ocellated white spots on the under side. As to the first, there is no doubt that this band of orange spots is generally most fully developed in the southern localities; but the supposition, that it always decreases as we proceed northwards, is certainly erroneous; for some of the finest and most brilliant specimens in this particular that I have seen are from parts as far north as Liverpool, from our own district, and from Edinburgh; those from the two last localities bearing the white spot of P. Artaxerxes. We may therefore, I think, safely dismiss this band as any criterion of specific difference.

Next, as to the black or white spot on the upper wings. It would appear that throughout the continent of Europe, widely diffused as I shall hereafter show P. Agestis to be, not a single specimen has been recorded as deviating from the type, even in latitudes much colder than our own, whereas, in Britain, it extends northwards as far as our most northern local habitat, Bamborough, mingled from Richmond, in Yorkshire, with the Artaxerxes form. Even in the most southern parts of our island we have a few examples recorded which link the

* In 'Catalogue of the Lepidoptera of Northumberland and Durham,' p. 29.

types together. The oldest I quote from Stephens' work, under P. Artaxerxes,—"I once observed it on Dartmoor, 23rd August, 1823. —*Dr. Leach;*" and Mr. Stainton, in his 'Manual,' under P. Agestis, says "A singular variety, with a white spot on the upper side, in the centre of the fore wings, was taken near Brighton, last July (1855), by Mr. H. Cooke. The under side agreed entirely with the ordinary appearance of P. Agestis. Mr. Bond, one of our best out-of-door naturalists, and an excellent Lepidopterist, informs me that he has occasionally seen a specimen in the South, with a small white spot on the wing." Mr. Vaughan says "he once took a specimen near Bristol, with a clear white ring round the black dot in the anterior wing;" and Mr. Sircom, in a communication to the 'Zoologist,' 1844 (Zool. 773), mentioned other similar cases in the South. From Yorkshire, northwards, these white-spotted specimens are numerous, and ultimately, it would seem, the only form we have. I think, therefore, we may reasonably conclude that the presence of a white or of a black spot will not suffice to establish the fact of there being two species.

Finally, we have to consider the point of ocellated or non-ocellated spots on the under side; in other words, whether the absence or the presence of minute black dots in the centres of the white spots underneath be sufficient to divide the specimens into two species. I may premise that the presence of this black dot in the discoidal spot of the under side of the anterior wings destroys the Fabrician and Haworthian "puncto medio utrinque albo," as well as Stephens' "utrinque maculâ discoidali albâ," at once; and yet the latter author seems to have overlooked the fact that his variety β, as given above, necessarily had this effect! The examination of all our British Polyommati, with their varieties, and of the best figures of the European species, convinces me that the only spots or ocelli that are never wanting are those placed at the apex of the discoidal cell of each wing, and consequently, that either the absence or the presence of any one or more of the others, and, *à fortiori*, their having pupils or not, affords no unvarying specific character. I might enlarge upon this point, but refrain, and proceed rather to apply the proposition to the insect before us. Mr. Gregson, of Liverpool, one of our most observant Lepidopterists, is of opinion, founded on his long and wide-spread experience in collecting, that the full development, and also the brightness of the ocelli in these insects, depend much upon the warmth of the season of their appearance in the perfect state. According to this law, which certainly obtains amongst insects generally, when undisturbed by local causes, we might expect, and in fact find, that,

in the southern form of P. Agestis, the ocelli are the most brilliant, having the black centres large and perfect. Still this is not always so, for not only are some of those centres suppressed, but in many cases one or more of the ocelli are entirely wanting. In our own locality, where the connecting form P. Salmacis of Stephens appears in any numbers, and where hundreds of specimens have passed through my hands, the majority bear the impress of the southern type, though few of them have the ocelli so brilliant as in specimens from that part of England. These ocellated specimens are not confined to such as have either the white or black discoidal spot on the upper side, but seem to occur indiscriminately. By far the most interesting variety I have yet seen of this butterfly is one in my own cabinet, which I captured in July, 1856, at Castle Eden, having the spot on the upper wing white, with a black centre. Underneath, the only spots within the orange band on its upper wings, are the discoidal —white, with a small black centre,—all the others being entirely obliterated on one wing; whilst, on the other, there is the sole addition of a most minute one between the third and fourth nervures. On both under wings, with the exception of the discoidal spot, and the usual triangular blotch, every trace of ocelli within the same band is wanting. Taking next the Scotch form, we find, that although the great bulk of the specimens have the black centres of the ocelli suppressed, still they are not always so; for not a few that I have examined possess them, and it is probable that one of these latter specimens furnished Mr. Stephens was his variety β. We see, therefore, that the variation of these ocelli, or spots, instead of furnishing a means of separating P. Agestis from the P. Artaxerxes, in reality links them together, and, by means of P. Salmacis, completes their identity. Thus we find all the three points of supposed specific distinction fail when rigidly tested, and the discovery of the larva of P. Agestis feeding on the Helianthemum alone needed to settle the point beyond doubt or question; for Mr. Bond informs me he has in his cabinet a chrysalis of the southern P. Agestis, which is exactly like one of P. Artaxerxes sent him by Mr. Logan. Nor do I think this discovery at all unlikely. The domestic habits, if the expression may be allowed, of the Polyommati are well known to all entomologists. They never roam far from home, like most of our butterflies, but confine their flight to a few yards around their native places. Now, Mr. Logan has proved the connection that exists between the larva of P. Artaxerxes and this plant, and I have traced the range of it and our P. Salmacis in conjunction therewith from Richmond to Kincardineshire. Let us notice how far a similar

connection appears to hold good with P. Agestis. It is somewhat remarkable that long before the above facts as to P. Artaxerxes had even been suspected, the southern P. Agestis and the Helianthemum were associated together. Dr. Jordan, in a communication to the 'Zoologist' for 1844 (Zool. 348), on the occurrence on the Polyommati in South Devon, says "P. Agestis double-brooded, May and August; local; frequents rocky places in woods. I took it in considerable plenty in Bradley Woods, near Newton, Devon, settling on the flowers of the Helianthemum vulgare, though I did not see a single specimen until I came to the rock where this plant was growing." In reply to my inquiries as to this point, Mr. Cooke writes me, "I have never taken P. Agestis, except in localities where the Helianthemum grows freely. The wild geraniums do grow here (Brighton), and in many of the localities where P. Agestis is taken, but they occur only sparingly; and in one spot, where I take my finest specimens, and where indeed I caught the curious variety you allude to (mentioned above), I have reason to believe the geraniums do not grow at all." Further, I may add that Mr. Gregson, who has taken it in North Lancashire, Cheshire, Derbyshire, Yorkshire, Lincolnshire and Wales, says "I have never taken P. Agestis, except in localities where the Helianthemum grows." I might multiply these instances, but refrain. They are pretty strong indications that the larva of the southern form finds equally with the northern one a pabulum in this plant.

GEORGE WAILES.

Double-broodedness of Acherontia Atropos and Notodonta ziczac.—I have defined, in a previous number (Zool. 4902), my interpretation of the expression "single-brooded;" it is "when the cycle of animal life occupies an entire year." I admit that the state of imago, pupa, &c., *may occur twice* in the year in a single-brooded insect, but if all the four states occur *twice*, then is the species double-brooded. During the past unusually warm season the imago of Acherontia Atropos has appeared at two distinct seasons. Perhaps it always does so: this year there can be no doubt of the fact: these seasons were June and October; and, moreover, the June moths are unquestionably the parents of the October moths. Let A (first brood) be a female imago in June; it laid eggs on the potato: the eggs hatched in June, the larvæ fed in June, July and August; they became pupæ in September, and perfect moths, B (second brood), on the 1st of October. Here then, to all appearance, we have two broods in one year; and if I clearly understand Mr. Gascoyne's papers (Zool. 5826, 6248) this is what he would receive as conclusive evidence that Acherontia Atropos was double-brooded; but this is not so: the moths of June, 1858, were *a portion* of a brood which went down in September, 1857; and *a portion* of their progeny will, in like manner, survive the coming winter, it matters not whether as pupæ or perfect insects, and will

appear on the wing in June, 1859. The state of egg occurs but once; the state of larva occurs but once; the state of pupa occurs twice. And there is even another possible source of error,—the moths which emerge in October may, and do occasionally, hybernate and re-appear in company with those of the summer disclosure in June. I would also beg to remind Mr. Gascoyne that, even supposing it proved most clearly that two cycles of existence were completed by a Notodonta in 1858, still the temperature of the past season having been abnormal, the rapid progress of insect transformations may have been abnormal also.—*Edward Newman; October* 1, 1858.

Sound produced by Larva of Acherontia Atropos: beautiful Variety of the same Insect.—In corroboration of a statement in the 'Zoologist' (Zool. 6212) on the sound produced by the larva of Acherontia Atropos, it may be worth while to add that the same power of uttering a sound was observed in some larvæ of A. Atropos this autumn: this sound was described to me by those who had charge of these caterpillars as a "short squeak," not easily described. Having never heard the sound myself I concluded that it was imaginary, but I think that the corroborating testimony of your correspondent now places the fact beyond a doubt. I had been intending to write on the subject of these larvæ, in consequence of the very remarkable appearance presented by some individual specimens found here this summer. I can merely relate this abnormal appearance as it was described to me, for, having been away from home, the larvæ had all buried before my return. Upwards of twenty larvæ were found in the neighbourhood and brought in, and of these four were of a uniform dark, dingy olive-black, underlaid with yellow, and frosted with bright white points; the three segments next to the head were of the purest white, like white linen, but marked with distinct, defined markings of velvety black; the general ground-colour and texture was described as much like that of a rhinoceros hide, but dark, and the rough frosting white; the three white segments next the head were smooth in texture; the lateral stripes were clearly defined, but black instead of blue, and differing from the ordinary larva in their being so disposed as to produce a series of diamond-shaped marks along the back. The colour was even and decided throughout, and had no connexion whatever with the slight brownish change of colour that larvæ assume just before burying.—*W. Oxenden Hammond; St. Alban's Court, near Wingham, September* 2, 1858.

Occurrence of Sphinx Convolvuli in Devonshire.—A specimen of this insect was taken at Teignmouth, Devon, a few days ago, and was given to me alive.—*P. H. Gosse; Torquay, September* 25, 1858.

Occurrence of Sphinx Convolvuli in the Metropolis.—On the 1st of October a male of this insect was taken in Liverpool Street, Bishopsgate; a second specimen at Stamford Hill on the 2nd; a third was brought here by a pressman: all these are now at No. 7, York Grove, Peckham.—*Edward Newman.*

Occurrence of Deilephila Galii at Brighton.—On the 3rd of September a large female specimen of D. Galii was brought alive to F. M. D'Alquen, Esq., of 8, Montpellier Terrace, in this town: he has kindly added it to my collection.—*John N. Winter;* 28, *Montpellier Road, Brighton, September* 24, 1858.

Query respecting a Caterpillar.—A large naked caterpillar infests the ash trees at a gentleman's seat in this district, by burrowing into the very heart of the wood throughout in channels. The insect is purplish black on the back, with the sides reddish yellow, and is in length from three to four inches. Several large trees are completely killed, and in cutting into and through the tree, the meandering course of

the insect may be seen, presenting a complete honeycomb. What moth does it result in?—*Edward Hearle Rodd; Penzance, August* 26, 1858.

[Cossus ligniperda.—*E. Newman.*]

Zeuzera Æsculi feeding on Ash.—On the 23rd of June last Mr. Schofield and I obtained eighteen specimens of this insect from an ash tree, of which number six were males; we also saw the pupa-cases of about fifty others protruding from the bark of the same tree.—*W. Groves;* 12, *Morden Place, Lewisham Road.*

Double-broodedness of the Notodontidæ.—The paper on the double-broodedness of the Notodontidæ (Zool. 6248) brings to my mind some notes, which I thought of sending you when the subject was discussed before; and as there is probably at the present time the same indistinct perception of what is included in the phrase "double-brooded" as was so evident then, they may still be of use. A moth spends a portion of its life in four different stages, *viz.* egg, larva, pupa and imago; and when an insect is said to be "double-brooded" we understand that it passes through the whole of these four stages twice in the course of twelve months; and as some spend a long time in one of these stages and some in another, it is clear that evidence extending over only a few months can never prove this fact. For instance, to take the evidence brought forward by Mr. Gascoyne, which is almost as satisfactory as a single experiment on such a subject can be, that portion of the evidence which goes far to render it conclusive, I mean the hatching of the second brood of larvæ, is introduced almost parenthetically at the end of the paper, and the writer seems to have been hardly aware of its value: the evidence adduced in the body of the paper is that perfect insects which emerged about the end of May produced larvæ which fed up in July, and changed to perfect insects early in August: now these insects might have hybernated, or they might have laid eggs which would not hatch till the same time as those laid in May, or these eggs might produce larvæ which would remain half-fed through the winter and feed up with the spring larvæ; in either case, the double-broodedness is "not proven." To the last of these alternatives the evidence adduced is still open, and I hope Mr. Gascoyne will publish the results of his experiments when the cycle is complete, as he may feel assured that many who have taken no part in the controversy are watching it with interest.—*Thomas Boyd;* 17, *Clapton Square, N.E., October* 9, 1858.

Habits of Nudaria Senex.—I was not acquainted with the habits of this little insect till the other day. Happening to go down one evening (July 14th) to a marsh near here, I noticed a small pale moth, which I took to be a Crambus, flying over the tops of the rushes at twilight. I at once caught it, and found it to be N. Senex. On that and two or three other evenings, I took twenty or thirty. The female seems to be sluggish, for I only took two.—*H. Harpur Crewe; Stowmarket, August* 9, 1858.—*From 'The Naturalist.'*

Capture of Leucania vitellina at Brighton.—I send for your inspection what I believe to be a specimen of Leucania vitellina, which I took with my own hands at Brighton in September; two friends who were with me at the time saw it alive in my net. I have not compared it with Mr. Cooke's specimen, but think I am right in the name.—*T. Thorncroft;* 87, *North Lane, Brighton, October* 18, 1858.

[The insect is unquestionably Leucania vitellina.—*E. Newman.*]

Note on Nonagria Typhæ.—I met with seven or eight pupæ, and two or three full-fed larvæ last week, (July 20th), at Stowmarket, in the stem of Typha latifolia. It is not however common in this neighbourhood. I have noticed that though the larva

feeds indiscriminately upon those plants that have flowers, and those that have not, and will sometimes completely hollow out the flower-stalk, it almost invariably forms its cocoon in a plant without a flower. The pupa must be kept very moist, or you will not breed the perfect insect. It is best, if possible, to cut off the stem with the pupa in it, but if it slips out, as it is very likely to do, the best plan is to lay it upon some damp earth, in a tolerably close-fitting tin box. I have seen the pupa so low down in the stalk, as to be partially submerged in the water. The perfect insect should always, if possible, be stuffed, as it is more subject to grease than perhaps any other moth, and will undergo numberless immersions in turpentine and magnesia without being cleansed. —*H. Harpur Crewe.—From 'The Naturalist.'*

Occurrence of Synia musculosa at Brighton.—On the 10th of August I had the good fortune to capture a female specimen of the above rare and beautiful insect; a friend with me the same evening took two others, male and female; the same friend a few days before took a female specimen of Pieris Daplidice; another person here on the 5th instant also took this insect, which I saw alive.—*T. Thorncroft; Brighton, August* 18, 1858.—*Id.*

Occurrence of Acronycta Alni near York.—In 1856 a larva of this species feeding on the willow, was taken in the Museum Gardens by Mr. Brown, which he succeeded in rearing the following year. On the 16th of August, 1857, I was equally fortunate in taking another in our garden, which fed on lime, from the pupa of which, on the 30th of last May, emerged a beautiful specimen of this rare insect. On the 13th ult. Mr. Prest found a fine larva, which went down a few days afterwards, and on the 29th ult. Mr. Robinson obtained a larva, which was found on a blade of grass, the only trees near it consisting of oak and the common nut. Mr. Allis has also met with this species near York. I may here remark that although the 'Manual' states that all the Acronycta larvæ spin cocoons, such was not the case with any of those which I now record, all the pupæ being *on* or *under* the earth, without the least appearance of a cocoon.—*Robert Anderson; Coney Street, York, September* 2, 1858.—*Id.*

Larva of Dasycampa rubiginea.—In the course of last month I bred four specimens of D. rubiginea, from eggs laid in a pill-box by a female, taken at sallows near Marlow, last spring. The larva, when full fed, is remarkably cylindrical, and tapering towards the head; the colour is a dark olivaceous-brown (not a yellowish brown); the hair is exceedingly fine, and shines like gold in the sun, and is confined to the sides, reminding one of the larva of A. megacephala, so that it appears almost a naked larva; the blackish spots on the back appear, at first sight, circular, but on examination are more nearly square, and are composed of two rhombi, divided by the dorsal line. The larvæ fed on the leaf of the Orleans plum, and were curiously concealed during the day-time among the leaves; so that, though I had them in a glass cylinder, I could seldom find more than one visible at a time. In regard to this species feeding on the plum, a very fresh specimen of the insect was taken near this place, on the bole of a damson tree, at sugar, and another specimen in an orchard, which facts are suggestive. The eggs appeared to hatch too early for the oak to be their common food. The perfect insect seldom appears here much before the end of October or beginning of November.—*B. Smith; Marlow, October* 5, 1858.—'*Intelligencer.*'

Occurrence of Xanthia ocellaris on the Coast.—No less than five of this insect have been taken this autumn: one by Mr. Tidy, on the 18th of September; one by Mr. Pratt, on the 21st; and one by Mr. Turner, on the 24th; all near Brighton: two by Mr. Harding, near Deal, about the same date. Mr. Smith, a Brighton collector, took

the first specimen on the 6th of October, 1856; this is in the cabinet of the Rev. Mr. Image.—*Edward Newman; October* 1, 1858.

Larva of Ennomos fuscantaria.—I have bred seven specimens of E. fuscantaria from the egg, all males,—a circumstance which has occurred in another instance known to me, and which seems to indicate that the female is really scarcer in this species. The larvæ fed upon ash, but some of them were much earlier than others, the eggs hatching very late, and at considerable intervals. The markings described in the 'Manual' as belonging to this larva are by no means distinct, but almost obliterated, so that the appearance of the larva is that of a plain green looper, attenuated towards the head. The pupa is also green, suspended in a leaf, like that of E. angularia, and assuming purplish tints two days before it emerges.—*B. Smith; Marlow, October* 5, 1858.—*From the 'Intelligencer.'*

The Genus Oporabia.—May I be permitted to ask Mr. Gregson, through the medium of the 'Zoologist,' if he is certain that the insect he calls Oporabia autumnaria (Zool. 6193), and which he says has been bred by Mr. Greening from larvæ on oak, is the autumnaria of Doubleday's 'List'? I have always understood that the insect therein indicated, and which we have been in the habit of calling autumnaria in this country, was a birch-feeder, and I have bred the insect to which I allude from this tree, the larva differing sufficiently from that of the common dilutata, but not I suspect equally from that of filigrammaria, which has been reared this season by Mr. Wilson from larvæ on heath. I should be much inclined to suspect that the insect bred from oak was, as suggested, a variety of O. dilutata.—*R. F. Logan; Duddingston, Edinburgh, October* 13, 1858.

Death of the Honey-bee supposed to be occasioned by a Fungus.—Mr. Martin, of Liverpool, makes the following communication to the Rev. Henry Higgins:—"In October last I had three hives of bees which I received into my house. Each doorway was closed, and the hive placed upon a piece of calico; the corners were brought over the top, leaving a loop by which the hive was suspended from the ceiling. The hives were taken down about the 14th of March; two were healthy, but all the bees in the third were dead: there were a gallon of bees. The two hives containing live bees were much smaller, but in each of them were dead ones. Under whatever circumstances you preserve bees through the winter, dead ones are found at the bottom in the spring. The room, an attic, was dry; and I had preserved the same hives in the same way during the winter of 1856. In what I may call the dead hive there was abundance of honey when it was opened; and it is clear that its inmates did not die from want. It is not a frequent occurrence for bees so to die, but I have known another instance. In that case the hive was left out in the ordinary way, and possibly cold was the cause of death. I think it probable that my bees died about a month before the 14th of March, merely from the circumstance that some one observed about that time that there was no noise in the hive. They might have died earlier; but there were certainly live bees in the hive in January. I understand there was an appearance of mould on some of the combs. There was ample ventilation, I think; indeed, as the bees were suspended, they had more air than through the summer when placed on the stand." Mr. Higgins makes the following observations on the above:—"When the occurrence was first made known to me, I suggested that the bees might probably have died from the growth of a fungus, and requested some of the dead bees might be sent for examination. They were transmitted to me in a very dry state; and a careful inspection with a lens afforded no indications of vegetable growth. I then

broke up a specimen, and examined the portions under a compound microscope, using a Natchet, No. 4. The head and thorax were clean, but on a portion of the sternum were innumerable very minute, linear, slightly curved bodies, showing the well-known oscillatory or swarming motion. Notwithstanding the agreement of these minute bodies with the characters of the genus of Bacterium of the Vibrionia, I regarded them as spermatia, having frequently seen others undistinguishable from them under circumstances inconsistent with the presence of Confervæ, as in the interior of the immature peridia and sporangia of Fungals. In the specimen first examined there were no other indications of the growth of any parasite; but from the interior of the abdomen of a second bee I obtained an abundance of well-defined globular bodies resembling the spores of a fungus, varying in size from ·00016 in. to ·00012 in. Three out of four specimens subsequently examined contained similar spores within the abdomen. No traces of a mycelium were visible; the plants had come to maturity, fruited, and withered away, leaving only the spores. The chief question then remaining to be solved was as to the time when the spores were developed; whether before or after the death of the bees. In order, if possible, to determine this, I placed four of the dead bees in circumstances favorable to the development of the spores, and in about ten days I submitted them again to examination: they were covered with mould, consisting chiefly of a species of Mucor, and one also of Botrytis or Botryosporium. These Fungi were clearly extraneous, covering indifferently all parts of the insects, and spreading on the wood on which they were lying. On the abdomen of all the specimens, and on the clypeus of one of them, grew a fungus wholly unlike the surrounding mould. It was white and very short, and apparently consisted entirely of spores arranged in a moniliform manner, like the fertile filaments of a stemless Penicilium. These spores resembled those found in the abdomen of the bees, and proceeded, I think, from them. The filaments were most numerous at the junction of the segments. The spores did not resemble the globules in Sporendonema Muscæ of the 'English Flora,' neither were they apparently enclosed."—*Proc. Linn. Soc.* 1857.

Black specimen of Cicindela campestris.—I have a Cicindela campestris which is entirely black, excepting the mouth and spots, which are of the usual cream colour. I wish to know if such a variety be uncommon or rare.—*Thomas Chapman; Bothwell Street, Glasgow, October* 26, 1858.

Reappearance of Scolytus rugulosus at Greenwich.—Scolytus rugulosus has again made its appearance, assuming the perfect state early in June. Cossus ligniperda and Trochilium Myopæforme have also emerged from the same pear-tree as that from which I obtained Scolytus rugulosus.—*W. Groves;* 12, *Morden Place, Lewisham Road, October*, 1858.

Beetles at Lee.—On the afternoon of the 12th inst. Dr. Power called on me, and proposed an excursion to the favourite hunting-ground known as "the sallow pit," in the fields at Lee. The pond, the beloved retreat of water-beetles, is no more,—the heat has been too much for it, and its fluids have evaporated. It might have been thought that the Hydradephaga had gone off to "fresh fields and pastures new," and so doubtless some of them have, but others, of a clannish nature, still hold on to the place of their nativity, their last refuge being a little hole containing about a pailful of water and a foot of mud. This reservoir, hidden by Sparganium, was accidentally discovered by a boy, who, while rushing away from some angry bees whose nest he had wantonly destroyed, put one of his legs into it as far as the knee; when he drew it out of the Stygian compound his equanimity was considerably disturbed as well

as a quantity of carburetted hydrogen. But the scent that disgusted him delighted us two beetle-hunters; as his face fell our hopes rose, and our expectations were not disappointed, for out of the muddy hole four dips of the net brought about two dozen of Colymbetes Grapii. It was impossible to clean them, so they went, dirty as they were, into the prison ready for them, where they looked like veritable bottle imps. The other beetles fished out were few and of common species, so that the *élite* Grapii had had it all their own way in their elysium until they were so rudely intruded upon. By the time the net had been four times examined there was not light enough to distinguish any more of the black hexapods on so dark a ground, and although doubtless many more remained in the hole they got only a terrible fright. Just when the discovery of their retreat was made, we had become aware that the warm and still air was full of flying creatures rejoicing in the twilight; those that were caught were chiefly Hydrobii and Philhydri, but there were also a few good Staphylinidæ. To close this inverted story, I may say that we began our researches by hunting among the *débris* on the ground, and were rewarded with Stenus solatus, S. impressus and Anchomenus gracilis. When winter and water return, and the beetles are concentred in the tufts of grass, we hope to get more of these interesting species.—*J. W. Douglas; Lee; Sept.* 18, 1858.—*From* '*The Intelligencer.*'

Notes on Myrmecophilous Coleoptera.—I imagine that the interest of the entomologists of the Association may possibly be excited by the tolerably complete collection of the known British myrmecophilous insects. It is a group which until recently has been almost unknown to our naturalists, and embraces a considerable number of creatures which had hitherto escaped their researches. Most of these singular animals appear to spend their lives, sometimes in the immediate vicinity of the ants' nests, sometimes in the very heart of them; and although endowed with ample powers of flight, wander but little from their quarters. Hence it has has happened that a casual specimen has now and then fallen to the lot of the collector, and the greater part have been unknown, or known only as unique, or nearly unique, examples, and even their authenticity suspected. Messrs. Janson and Waterhouse acting as pioneers, Messrs. Reading, Edwin Shepherd, Douglas, myself, and sundry others, have, within the last few years, by carrying on the war in and about the nests themselves, brought to light many new species, or found others to be abundant which were previously almost unknown. Mr. Janson has in the 'Entomologists Annual,' of last year, published a most valuable account of the habits of these insects, and the mode of searching for them. I must say, however, that I cannot sympathise with him in his tender feelings towards these voracious hosts of our coleopterous favourites. According to my own experience, the spring, *i.e.* about April and May, is the most productive season for examining the nests of Formica rufa (which affords much the greatest number of insects) before the ants have actively begun their labours: the Coleoptera then seem to be accumulated in their immediate neighbourhood, instead of being scattered over a large extent of ground as they subsequently are. Soon after this period we often see the ants commence the process of gradually deserting an old and inconvenient nest, and taking up new quarters close by. I have found these old nests afford by far the best harvest of insects, which in the appetite for formic acid or its odour (apparently necessary to their constitution) congregate amongst the few remaining ants. If a few showers of rain should then fall and wash away the acid, the beetles entirely desert the nest. The most efficient plan of search with this nest is to place a few handfuls of the material taken from near the ants upon a somewhat fine cabbage-net, laid on a sheet

of brown paper. Saprini, Dendrophili, &c., have a tendency when disturbed to make their way downwards, and if, after a short time, you lift the net to another part of the paper, you remove the *débris*, and leave the insects behind. The outskirts of the nests should also be well examined, as Mr. Janson describes, looking under stones, &c. The nests of Formica fuliginosa are more productive rather later, when the ants are in activity,—but the investigation is to be carried on chiefly in the *neighbourhood* of the nest, in damp places around it and where the ants run. The ground being stirred up the insects will appear if you watch for them. Little is usually to be obtained *in* the nest, which is generally in the trunk of an old tree. The nests of F. fusca, F. flava and Myrmica rubra afford but few species, and these are chiefly to be found in the galleries, under stones, &c. which may lie upon the nests. It is reasonable to expect that more species may be obtained by the examination of the nests of other ants, especially as the denizens of one kind appear seldom to associate with those of others. Formica fusca and F. flava seem to be the most convertible, *i. e.* you often find the same insects in both. In the nests of F. fuliginosa you almost invariably find something. In those of F. rufa you get many in some, but very many worth nothing. In those of F. flava, F. fusca and Myrmica rubra you may examine hundreds and get nothing. As yet we have obtained results from only a few species, *viz.*, Formica sanguinolenta, F. flava, F. fusca, F. fuliginosa, F. rufa and Myrmica rubra. I have set out specimens of the ants, and under each have placed the genera and species usually associated with them, and which may be expected to be found in their nests.—*J. A. Power.**

Locusts in Shetland.—The following is an extract from a letter, dated Lerwick, September 27, 1858:—"Great numbers of the Locusta migratoria of Linneus have occurred in this far north during the present month, in the corn-fields and all the islands of any size, even in extreme Unst." Great numbers have also been taken in Caithness.—*C. W. Peach; Wick.*

Occurrence of Locusta migratoria in Shetland.—A number of locusts were found last month, amongst corn-fields, in most of the Shetland Islands, as likewise in the bare and isolated Skerry Islands.—*Thomas Edward; Banff, October* 4, 1858.

[Similar information reaches me through a variety of channels, especially local newspapers: in some localities on the north-eastern coast and islands of Scotland this advent of locusts has amounted to a positive plague.—*E. Newman.*]

Note on Cydippe Pileus.—Yesterday I used a gauze tow-net unsuccessfully for two hours, so rolled it up and came ashore: on reaching home, seeing a pellucid drop clinging to the net, I floated it off in a glass of sea-water, and found it was a Beroe (*Cydippe Pileus*), which was evidently damaged by the compression of the net, and some of the bands of cilia were nearly obliterated. The creature seemed incapable of motion, save constant vibration of the remaining cilia. The next morning the globular form was gone, and more than half the animal was represented by an amorphous flocculent mass; the cilia on the crystalline portion were still in vigorous action: in an hour after the whole of it had sunk into the opaque flocculent condition, and all of

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* Read at the Meeting of the British Association for the Advancement of Science.

course was still. It appeared as if death crept gradually over the creature, but perhaps the movement of the cilia should not be accepted as a proof of life, as it is well known that in the highest animals ciliary action will continue long after death. — *George Guyon; Ventnor, Isle of Wight, September* 29, 1858.

Infusoria on a Prawn. — The other day I observed the interior of the exuvia of a small prawn that was lying in a bottle of sea-water swarming with infusoria, which were no doubt attracted by some nutritive matter adhering to the shell. They had penetrated all the limbs; the legs were thronged, and some were disporting themselves in the very claws. But it was most curious to see them passing along the antennæ, which appeared as slender as a human hair; they were visible for two-thirds or three-fourths the length of the organ, but beyond that distance it was no longer navigable even for their minute frames, being but the $\frac{1}{180}$ inch diameter. The scene was a Temple Bar in miniature, and many an atom found himself too bulky to pass his comrade. One antennæ exhibited a slight monstrosity, the 44th joint being $\frac{1}{8}$ inch long, or equal to about six of the neighbouring joints.—*Id.*

Proceedings of Societies.

Entomological Society.

October 4, 1858.—J. O. Westwood, Esq. V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors: — 'Bibliotheca Historico-naturalis. Achter Jahrgang, von Ernst A. Zuchold;' presented by the Editor. 'Proceedings of the Zoological Society,' Nos. 350 to 362; by the Society. 'Proceedings of the Royal Society,' No. 32; by the Society. 'Mémoires d' Entomologie publiées par la Société Entomologique des Pays-bas, Livraisons,' 4, 5 and 6; by the Society. 'The Journal of the Society of Arts' for September; by the Society. 'The Zoologist' for October; by the Editor. 'The Literary Gazette' for September; by the Editor. 'The Athenæum' for September; by the Editor. 'The Natural History of the Tineina,' Vol. iii.; 'Manual of British Moths and Butterflies,' Nos. 20 and 21; 'The Entomologist's Weekly Intelligencer' for 1858; the same, No. 105; by H. T. Stainton, Esq. 'Monographie des Elaterides,' par M. E. Candize, Tome Premier; by the Author.

Election of Members.

R. H. Mitford, Esq., of Haverstock Place, Hampstead, was ballotted for and elected a Member; and W. H. Allchin, Esq., 7, Pembridge Villas, Bayswater, a Subscriber to the Society.

Exhibitions.

Mr. Stainton exhibited, on behalf of Mr. Boyd, some of the latter gentleman's most interesting captures in Cornwall this summer, interesting not merely as species

new to our lists, but from the fact that some of these insects had only hitherto been found in the Mediterranean or at Maderia. The principal species exhibited were

1. *Diasemia Ramburialis*, of which Mr. Boyd had only taken a single specimen ; this species was first detected in the Island of Corsica.

2. *Gelechia leucomelanella*, a conspicuous black and white species, hitherto known only as a native of Central Europe, bred from Silene maritima.

3. *Gelechia Cornubiæ*, n. s. (or a variety of Solutella) ; this was not scarce among the Cornish heath (*Erica vagans*).

4. *Gelechia Ocellatella*, n. s., bred from Beta maritima ; this species had been obtained in Maderia by Mr. Wollaston.

5. *Glyphipteryx schœnicolella*, n. s., allied to G. oculatella ; these were bred from the heads of Schœnus nigricans.

6. A series of *Elachista triseriatella* and *dispunctella*, clearly showing that those two species were merely forms of one and the same.

Mr. A. F. Sheppard exhibited, on behalf of Mr. C. S. Gregson, specimens of Peronea Potentillana, *Cooke*, recently described as a distinct species in the 'Zoologist' ; Mr. Sheppard expressed his opinion that the insects in question were varieties of P. Schalleriana.

Mr. Edleston sent for exhibition a series of specimens, from which it was evident that the so-called species is a mere variety.

Mr. Stevens exhibited some beautiful butterflies taken by Mr. Wallace in Celebes, amongst which were both sexes of Ornithoptera Remus and O. Haliphron, Papilio Androcles, and two undescribed species of that genus, some fine Pieridæ, &c.

Mr. Bond exhibited two bred specimens of Xanthia gilvago, and an example of Agrotis saucia, in most perfect condition, which was infested by hundreds of a small Acarus, of a species unknown to the Members present.

Dr. Knaggs exhibited some Noctuæ, &c. lately taken at Camden Town, observing that the occurrence of such species close to the metropolis was interesting ; they included Agrotis saucia, A. corticea, and A. ravida, Gortyna micacea, Eudorea Cembræ, &c. ; he also exhibited some larvæ of a species of Dynastes, from Demerara, preserved in spirits, and a small female of a Termes from the same locality.

Mr. Stevens stated that he has recently been informed by a letter from Mr. H. W. Bates, that the small pale Scarites taken by him on the Amazons, and briefly characterized by Mr. Westwood, at the February Meeting of the Society, by the name of Solenogenys fæda, was an inhabitant of the nests of white ants.

Mr. Robinson exhibited specimens of Lamophlæus Clematidis, found in the stems of the Clematis Vitalba, near Gravesend.

Mr. Piffard exhibited a collection of insects, consisting chiefly of Coleoptera and Lepidoptera, which he had recently made in Nova Scotia and the vicinity of Demerara River.

Memoirs of the Entomological Society of the Netherlands.

Mr. Westwood called attention to the recently published 'Memoirs of the Entomological Society of the Netherlands,' as containing many beautiful figures and valuable papers ; he observed that the long illness and subsequent death of Dr. De Haan had caused the collections at the Leyden Museum to be much neglected ; he was, however, happy to say that his successor, Mr. S. C. Snellen van Vollenhoven,

was going energetically to work, and had recently shown him some excellent drawings intended to illustrate the work before him. The Leyden Museum was particularly rich in the insects of the Indian islands, such as the industry of Mr. Wallace was now adding to our British collections.

Mr. Westwood added that the drawers containing the larger Lepidoptera in the collection alluded to were constructed with glass bottoms, the insects being pinned to narrow slips of cork affixed thereto; this plan obviated the necessity of taking out the specimens to examine the under side, as to do so it was only necessary to turn the drawer upside down.

Bees Feeding on Pollen.

Mr. Tegetmeier stated that with a view to prove more satisfactorily that bees devoured pollen in their perfect state, he had driven the stocks from two ordinary straw hives into one of his bee hives, placing in the box above it some old comb filled with pollen, which was speedily eaten by the bees, although as there was a quantity of syrup in the food-pan, they were certainly not driven to devour it from hunger: he exhibited the empty comb to the Meeting, observing that the only mention made by any writer on bees of pollen being eaten by the perfect insects was in 'Kirby and Spence's Introduction to Entomology.'

Mr. Tegetmeier added that Mr. Darwin has lately coloured the margin of some cells in the course of construction, and found that the bees remasticated the coloured wax and used it in the formation of the cells, thus proving that they can work up old material.

Cylindrical forms of Cells.

Mr. Smith observed that the theory advanced by Mr. Waterhouse in the 'Penny Cyclopædia,' of the bees first making cylindrical excavations, only separated from each other by the thickness of the walls of the intended hexagons at their points of contact, certainly in his opinion, would render it absolutely necessary that the bee, or wasp working, should be able to insert its head into the excavations, otherwise, how could they possibly form the planes of the hexagons? Now, that such could not be the case in building the cells of the wasp, he was prepared to prove. Mr. Smith exhibited the spring nest of Vespa vulgaris, in which the mother-wasp had constructed about thirty cells, seven only being carried up to their full height, which contained each a grub or a pupa, so that no worker had escaped; the cells being of such a size that by no possibility could the head of the builder be inserted into them; this, he contended, was in his mind decisive against the theory alluded to, at least it was not applicable to the building of the nests of the Vespidæ.

Mr. Smith also called particular attention to a singular fact, namely, that in the nest of the wasp the smallest cells were built in the spring nests by the largest individual, the female; whilst the largest cells, those required for the females and males, were built in the summer by the smallest individuals, the workers; now, as he understood the Waterhousian theory, the size of the planes of the hexagon, were determined by the distance the insects excavating could reach with its mandibles, if such were the case, how was it possible to reconcile the above facts with the theory of the 'Penny Cyclopædia.'

Mr. Westwood could not imagine how the female wasp constructed the beautiful

little nest before the Meeting without inserting her head into the cells, but it evidently was quite impossible for the insect to do so, as stated by Mr. Smith.—*E. S.*

Northern Entomological Society.

September 26, 1858.—B. Cooke, Esq., in the chair.

Election of Members.

Thomas John Moor, Esq., of the Derby Museum, Liverpool; George Turner, Esq., of the Royal Institution, Liverpool; John Johnson, Esq., of the Police Station, Old Swan, near Liverpool; and James Fitzgerald Brockholes, Esq., Cleveland Street, Birkhenhead, were elected Members.

Exhibitions.

Mr. Brockholes exhibited a Spælotes augur perfectly black, &c.

Mr. Almond exhibited very fine specimens of Tabanus bovinus, Tachina grossa, Volucella bombylans and Ptomophagus fumatus, recently captured near Loch Rannoch.

Mr. Cooper exhibited fine specimens of Agrotis saucia and Xanthia citrago, captured near Warrington, at sugar.

Mr. Kendrick exhibited a box, of all orders, in which were a number of very interesting species, especially amongst the Stegoptera and Homoptera.

Mr Birchall exhibited a most interesting box, the most noticeable of its contents was Noctua ditrapezium, fine as bred, taken at sugar, in Galway, in June.

The Secretary exhibited Eupithecia consignata, E. debiliata and E. pusillata, from H. Doubleday, Esq., and a new Tinea, bred in skins, from Honduras, given to him by Mr. Brockholes, who bred it, observing that no doubt this will soon propagate its species here to the annoyance of all "gude housewives;" it is allied to Nigrifoldella, but much smaller: he then exhibited a series of a new Tinea allied to Merdella, part of them bred by Mr. Greening, part captured by Mr. Cooper, and the remainder bred by himself, collected together for comparison with Merdella, from which it differs in its much darker colour, and the disposition of its markings and its dark head and under wings; it is a fine species: he then exhibited a box in which were specimens of Phibalapteryx angustata, *Haw.* (gemmata), kindly sent by Mr. Harding, of Bristol, and specimens of the same species taken by himself in the Crosby Swamps; also Coleophora affirmatella, *Greg.*, C. albidella, *H.-Sch.*, bred in plenty from cases on sallows, observing that many cabinets had this species as anatipennella, from which it differed in the form of its case and food, the latter making a fuller case on the under side, as illustrated in the box, and feeding upon sloe and thorn: he then called attention to a fine series of Gelechia fumatella, *Doug.*, which he had again met with after several years' vain search; it was raked out on dry banks on the sand-hills, where Ononis arvensis add Galium verum grew amongst wild thyme, but seemed atached to the liquorice.—*C. S. G.*

*Three Papers on the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection.**

1. Extract from an unpublished work on Species by C. Darwin, Esq., consisting of a portion of a Chapter intituled, "On the Variation of Organic Beings in a state of Nature; on the Natural Means of Selection; on the Comparison of Domestic Races and true Species."

DeCandolle, in an eloquent passage, has declared that all nature is at war, one organism with another, or with external nature. Seeing the contented face of nature, this may at first well be doubted; but reflection will inevitably prove it to be true. The war, however, is not constant, but recurrent in a slight degree at short periods, and more severely at occasional more distant periods; and hence its effects are easily overlooked. It is the doctrine of Malthus applied in most cases with tenfold force. As in every climate there are seasons, for each of its inhabitants, of greater and less abundance, so all annually breed; and the moral restraint which in some small degree checks the increase of mankind is entirely lost. Even slow-breeding mankind has doubled in twenty-five years; and if he could increase his food with greater ease, he would double in less time. But for animals without artificial means, the amount of food for each species must, *on an average*, be constant, whereas the increase of all organisms tends to be geometrical, and in a vast majority of cases at an enormous ratio. Suppose in a certain spot there are eight pairs of birds, and that *only* four pairs of them annually (including double hatches) rear only four young, and that these go on rearing their young at the same rate, then at the end of seven years (a short life, excluding violent deaths, for any bird) there will be 2048 birds, instead of the original sixteen. As this increase is quite impossible, we must conclude either that birds do not rear nearly half their young, or that the average life of a bird is, from accident, not nearly seven years. Both checks probably concur. The same kind of calculation applied to all plants and animals affords results more or less striking, but in very few instances more striking than in man.

Many practical illustrations of this rapid tendency to increase are on record, among which, during peculiar seasons, are the extraordinary numbers of certain animals; for instance, during the years 1826

* Reprinted from the 'Proceedings of the Linnean Society.'

to 1828, in La Plata, when from drought some millions of cattle perished, the whole country actually *swarmed* with mice. Now I think it cannot be doubted that during the breeding-season all the mice (with the exception of a few males or females in excess) ordinarily pair, and therefore that this astounding increase during three years must be attributed to a greater number than usual surviving the first year, and then breeding, and so on till the third year, when their numbers were brought down to their usual limits on the return of wet weather. Where man has introduced plants and animals into a new and favourable country, there are many accounts in how surprisingly few years the whole country has become stocked with them. This increase would necessarily stop as soon as the country was fully stocked; and yet we have every reason to believe, from what is known of wild animals, that *all* would pair in the spring. In the majority of cases it is most difficult to imagine where the checks fall, though generally, no doubt, on the seeds, eggs and young; but when we remember how impossible, even in mankind (so much better known than any other animal), it is to infer from repeated casual observations what the average duration of life is, or to discover the different percentage of deaths to births in different countries, we ought to feel no surprise at our being unable to discover where the check falls in any animal or plant. It should always be remembered, that in most cases the checks are recurrent yearly in a small, regular degree, and in an extreme degree during unusually cold, hot, dry, or wet years, according to the constitution of the being in question. Lighten any check in the least degree, and the geometrical powers of increase in every organism will almost instantly increase the average number of the favoured species. Nature may be compared to a surface on which rest ten thousand sharp wedges touching each other and driven inwards by incessant blows. Fully to realize these views much reflection is requisite. Malthus on man should be studied; and all such cases as those of the mice in La Plata, of the cattle and horses when first turned out in South America, of the birds by our calculation, &c., should be well considered. Reflect on the enormous multiplying power *inherent and annually in action* in all animals; reflect on the countless seeds scattered by a hundred ingenious contrivances, year after year, over the whole face of the land; and yet we have every reason to suppose that the average percentage of each of the inhabitants of a country usually remains constant. Finally, let it be borne in mind that this average number of individuals (the external conditions remaining the same) in each country is kept up by

recurrent struggles against other species or against external nature (as on the borders of the Arctic regions, where the cold checks life), and that ordinarily each individual of every species holds its place, either by its own struggle and capacity of acquiring nourishment in some period of its life, from the egg upwards; or by the struggle of its parents (in short-lived organisms, when the main check occurs at longer intervals) with other individuals of the *same* or *different* species.

But let the external conditions of a country alter. If in a small degree, the relative proportions of the inhabitants will in most cases simply be slightly changed; but let the number of inhabitants be small, as on an island, and free access to it from other countries be circumscribed, and let the change of conditions continue progressing (forming new stations), — in such a case the original inhabitants must cease to be as perfectly adapted to the changed conditions as they were originally. It has been shown in a former part of this work, that such changes of external conditions would, from their acting on the reproductive system, probably cause the organization of those beings which were most affected to become, as under domestication, plastic. Now, can it be doubted, from the struggle each individual has to obtain subsistence, that any minute variation in structure, habits or instincts, adapting that individual better to the new conditions, would tell upon its vigour and health? In the struggle it would have a better *chance* of surviving; and those of its offspring which inherited the variation, be it ever so slight, would also have a better *chance*. Yearly more are bred than can survive; the smallest grain in the balance, in the long run, must tell on which death shall fall, and which shall survive. Let this work of selection on the one hand, and death on the other, go on for a thousand generations, who will pretend to affirm that it would produce no effect, when we remember what, in a few years, Bakewell effected in cattle, and Western in sheep, by this identical principle of selection?

To give an imaginary example from changes in progress on an island:—let the organization of a canine animal which preyed chiefly on rabbits, but sometimes on hares, become slightly plastic; let these same changes cause the number of rabbits very slowly to decrease, and the number of hares to increase; the effect of this would be that the fox or dog would be driven to try to catch more hares; his organization, however, being slightly plastic, those individuals with the lightest forms, longest limbs, and best eyesight, let the difference be ever so small, would be slightly favoured, and would tend to live

longer, and to survive during that time of the year when food was scarcest; they would also rear more young, which would tend to inherit these slight peculiarities. The less fleet ones would be rigidly destroyed. I can see no more reason to doubt that these causes in a thousand generations would produce a marked effect, and adapt the form of the fox or dog to the catching of hares instead of rabbits, than that greyhounds can be improved by selection and careful breeding. So would it be with plants under similar circumstances. If the number of individuals of a species with plumed seeds could be increased by greater powers of dissemination within its own area (that is, if the check to increase fell chiefly on the seeds), those seeds which were provided with ever so little more down would in the long run be most disseminated; hence a greater number of seeds thus formed would germinate, and would tend to produce plants inheriting the slightly better-adapted down.*

Besides this natural means of selection, by which those individuals are preserved, whether in their egg, or larval, or mature state, which are best adapted to the place they fill in nature, there is a second agency at work in most unisexual animals, tending to produce the same effect, namely, the struggle of the males for the females. These struggles are generally decided by the law of battle, but in the case of birds, apparently, by the charms of their song, by their beauty or their power of courtship, as in the dancing rock-thrush of Guiana. The most vigorous and healthy males, implying perfect adaptation, must generally gain the victory in their contests. This kind of selection, however, is less rigorous than the other; it does not require the death of the less successful, but gives to them fewer descendants. The struggle falls, moreover, at a time of year when food is generally abundant, and perhaps the effect chiefly produced would be the modification of the secondary sexual characters, which are not related to the power of obtaining food, or to defence from enemies, but to fighting with or rivalling other males. The result of this struggle amongst the males may be compared in some respects to that produced by those agriculturists who pay less attention to the careful selection of all their young animals, and more to the occasional use of a choice mate.

* I can see no more difficulty in this than in the planter improving his varieties of the cotton plant.—*C. D.*, 1858.

II. Abstract of a Letter from C. Darwin, Esq., to Prof. Asa Gray, Boston, U.S., dated Down, September 5th, 1857.

1. It is wonderful what the principle of selection by man, that is the picking out of individuals with any desired quality, and breeding from them, and again picking out, can do. Even breeders have been astounded at their own results. They can act on differences inappreciable to an uneducated eye. Selection has been *methodically* followed in *Europe* for only the last half-century; but it was occasionally, and even in some degree methodically, followed in the most ancient times. There must have been also a kind of unconscious selection from a remote period, namely, in the preservation of the individual animals (without any thought of their offspring) most useful to each race of man in his particular circumstances. The "roguing," as nurserymen call the destroying of varieties which depart from their type, is a kind of selection. I am convinced that intentional and occasional selection has been the main agent in the production of our domestic races; but however this may be, its great power of modification has been indisputably shown in later times. Selection acts only by the accumulation of slight or greater variations, caused by external conditions, or by the mere fact that in generation the child is not absolutely similar to its parent. Man, by this power of accumulating variations, adapts living beings to his wants,—may be said to make the wool of one sheep good for carpets, of another for cloth, &c.

2. Now suppose there were a being who did not judge by mere external appearances, but who could study the whole internal organization, who was never capricious, and should go on selecting for one object during millions of generations; who will say what he might not effect? In nature we have some *slight* variation occasionally in all parts; and I think it can be shown that changed conditions of existence is the main cause of the child not exactly resembling its parents; and in nature Geology shows us what changes have taken place, and are taking place. We have almost unlimited time; no one but a practical geologist can fully appreciate this. Think of the Glacial period, during the whole of which the same species at least of shells have existed; there must have been during this period millions on millions of generations.

3. I think it can be shown that there is such an unerring power at work in *Natural Selection* (the title of my book), which selects exclu-

sively for the good of each organic being. The elder DeCandolle, W. Herbert, and Lyell have written excellently on the struggle for life; but even they have not written strongly enough. Reflect that every being (even the elephant) breeds at such a rate that in a few years, or at most a few centuries, the surface of the earth would not hold the progeny of one pair. I have found it hard constantly to bear in mind that the increase of every single species is checked during some part of its life, or during some shortly recurrent generation. Only a few of those annually born can live to propagate their kind. What a trifling difference must often determine which shall survive, and which perish!

4. Now take the case of a country undergoing some change. This will tend to cause some of its inhabitants to vary slightly — not but that I believe most beings vary at all times enough for selection to act on them. Some of its inhabitants will be exterminated, and the remainder will be exposed to the mutual action of a different set of inhabitants, which I believe to be far more important to the life of each being than mere climate. Considering the infinitely various methods which living beings follow to obtain food by struggling with other organisms, to escape danger at various times of life, to have their eggs or seeds disseminated, &c. &c., I cannot doubt that during millions of generations individuals of a species will be occasionally born with some slight variation, profitable to some part of their economy. Such individuals will have a better chance of surviving, and of propagating their new and slightly different structure; and the modification may be slowly increased by the accumulative action of natural selection to any profitable extent. The variety thus formed will either coexist with, or, more commonly, will exterminate its parent form. An organic being, like the woodpecker or misseltoe, may thus come to be adapted to a score of contingencies—natural selection accumulating those slight variations in all parts of its structure, which are in any way useful to it during any part of its life.

5. Multiform difficulties will occur to every one, with respect to this theory. Many can, I think, be satisfactorily answered. *Natura non facit saltum* answers some of the most obvious. The slowness of the change, and only a very few individuals undergoing change at any one time, answers others. The extreme imperfection of our geological records answers others.

6. Another principle, which may be called the principle of divergence, plays, I believe, an important part in the origin of species. The same spot will support more life if occupied by very diverse forms.

We see this in the many generic forms in a square yard of turf, and in the plants or insects on any little uniform islet, belonging almost invariably to as many genera and families as species. We can understand the meaning of this fact amongst the higher animals, whose habits we understand. We know that it has been experimentally shown that a plot of land will yield a greater weight if sown with several species and genera of grasses, than if sown with only two or three species. Now, every organic being, by propagating so rapidly, may be said to be striving its utmost to increase in numbers. So it will be with the offspring of any species after it has become diversified into varieties, or subspecies, or true species. And it follows, I think, from the foregoing facts, that the varying offspring of each species will try (only a few will succeed) to seize on as many and as diverse places in the economy of nature as possible. Each new variety or species, when formed, will generally take the place of, and thus exterminate its less well-fitted parent. This I believe to be the origin of the classification and affinities of organic beings at all times; for organic beings always *seem* to branch and sub-branch like the limbs of a tree from a common trunk, the flourishing and diverging twigs destroying the less vigorous —the dead and lost branches rudely representing extinct genera and families.

This sketch is *most* imperfect; but in so short a space I cannot make it better. Your imagination must fill up very wide blanks.

C. Darwin.

III. On the Tendency of Varieties to depart indefinitely from the Original Type. By Alfred Russel Wallace.

One of the strongest arguments which have been adduced to prove the original and permanent distinctness of species is, that *varieties* produced in a state of domesticity are more or less unstable, and often have a tendency, if left to themselves, to return to the normal form of the parent species; and this instability is considered to be a distinctive peculiarity of all varieties, even of those occurring among wild animals in a state of nature, and to constitute a provision for preserving unchanged the originally created distinct species.

In the absence or scarcity of facts and observations as to *varieties* occurring among wild animals, this argument has had great weight with naturalists, and has led to a very general and somewhat prejudiced belief in the stability of species. Equally general, however, is the

belief in what are called "permanent or true varieties,"—races of animals which continually propagate their like, but which differ so slightly (although constantly) from some other race, that the one is considered to be a *variety* of the other. Which is the *variety* and which the original *species*, there is generally no means of determining, except in those rare cases in which the one race has been known to produce an offspring unlike itself and resembling the other. This, however, would seem quite incompatible with the "permanent invariability of species," but the difficulty is overcome by assuming that such varieties have strict limits, and can never again vary further from the original type, although they may return to it, which, from the analogy of the domesticated animals, is considered to be highly probable, if not certainly proved.

It will be observed that this argument rests entirely on the assumption, that *varieties* occurring in a state of nature are in all respects analogous to or even identical with those of domestic animals, and are governed by the same laws as regards their permanence or further variation. But it is the object of the present paper to show that this assumption is altogether false, that there is a general principle in nature which will cause many *varieties* to survive the parent species, and to give rise to successive variations departing further and further from the original type, and which also produces, in domesticated animals, the tendency of varieties to return to the parent form.

The life of wild animals is a struggle for existence. The full exertion of all their faculties and all their energies is required to preserve their own existence and provide for that of their infant offspring. The possibility of procuring food during the least favourable seasons, and of escaping the attacks of their most dangerous enemies, are the primary conditions which determine the existence both of individuals and of entire species. These conditions will also determine the population of a species; and by a careful consideration of all the circumstances we may be enabled to comprehend, and in some degree to explain, what at first sight appears so inexplicable—the excessive abundance of some species, while others closely allied to them are very rare.

The general proportion that must obtain between certain groups of animals is readily seen. Large animals cannot be so abundant as small ones; the Carnivora must be less numerous than the Herbivora; eagles and lions can never be so plentiful as pigeons and antelopes; the wild asses of the Tartarian deserts cannot equal in numbers the horses of the more luxuriant prairies and pampas of America. The

greater or less fecundity of an animal is often considered to be one of the chief causes of its abundance or scarcity; but a consideration of the facts will show us that it really has little or nothing to do with the matter. Even the least prolific of animals would increase rapidly if unchecked, whereas it is evident that the animal population of the globe must be stationary, or perhaps, through the influence of man, decreasing. Fluctuations there may be; but permanent increase, except in restricted localities, is almost impossible. For example, our own observation must convince us that birds do not go on increasing every year in a geometrical ratio, as they would do were there not some powerful check to their natural increase. Very few birds produce less than two young ones each year, while many have six, eight or ten; four will certainly be below the average; and if we suppose that each pair produce young only four times in their life, that will also be below the average, supposing them not to die either by violence or want of food. Yet at this rate how tremendous would be the increase in a few years from a single pair! A simple calculation will show that in fifteen years each pair of birds would have increased to nearly ten millions! whereas we have no reason to believe that the number of the birds of any country increases at all in fifteen or in one hundred and fifty years. With such powers of increase the population must have reached its limits, and have become stationary, in a very few years after the origin of each species. It is evident, therefore, that each year an immense number of birds must perish—as many in fact as are born; and as on the lowest calculation the progeny are each year twice as numerous as their parents, it follows that, whatever be the average number of individuals existing in any given country, *twice that number must perish annually*,—a striking result, but one which seems at least highly probable, and is perhaps under rather than over the truth. It would therefore appear that, as far as the continuance of the species and the keeping up the average number of individuals are concerned, large broods are superfluous. On the average all above *one* become food for hawks and kites, wild cats and weasels, or perish of cold and hunger as winter comes on. This is strikingly proved by the case of particular species; for we find that their abundance in individuals bears no relation whatever to their fertility in producing offspring. Perhaps the most remarkable instance of an immense bird population is that of the passenger pigeon of the United States, which lays only one, or at most two eggs, and is said to rear generally but one young one. Why is this bird so extraordinarily abundant, while others producing two or three times as

many young are much less plentiful? The explanation is not difficult. The food most congenial to this species, and on which it thrives best, is abundantly distributed over a very extensive region, offering such differences of soil and climate, that in one part or another of the area the supply never fails. The bird is capable of a very rapid and long-continued flight, so that it can pass without fatigue over the whole of the district it inhabits, and as soon as the supply of food begins to fail in one place is able to discover a fresh feeding-ground. This example strikingly shows us that the procuring a constant supply of wholesome food is almost the sole condition requisite for ensuring the rapid increase of a given species, since neither the limited fecundity, nor the unrestrained attacks of birds of prey and of man are here sufficient to check it. In no other birds are these peculiar circumstances so strikingly combined. Either their food is more liable to failure, or they have not sufficient power of wing to search for it over an extensive area, or during some season of the year it becomes very scarce, and less wholesome substitutes have to be found; and thus, though more fertile in offspring, they can never increase beyond the supply of food in the least favourable seasons. Many birds can only exist by migrating, when their food becomes scarce, to regions possessing a milder, or at least a different climate, though, as these migrating birds are seldom excessively abundant, it is evident that the countries they visit are still deficient in a constant and abundant supply of wholesome food. Those whose organization does not permit them to migrate when their food becomes periodically scarce, can never attain a large population. This is probably the reason why woodpeckers are scarce with us, while in the tropics they are among the most abundant of solitary birds. Thus the house sparrow is more abundant than the redbreast, because its food is more constant and plentiful,—seeds of grasses being preserved during the winter, and our farm-yards and stubble-fields furnishing an almost inexhaustible supply. Why, as a general rule, are aquatic, and especially sea birds, very numerous in individuals? Not because they are more prolific than others, generally the contrary; but because their food never fails, the sea-shores and river-banks daily swarming with a fresh supply of small Mollusca and Crustacea. Exactly the same laws will apply to mammals. Wild cats are prolific and have few enemies; why then are they never as abundant as rabbits? The only intelligible answer is, that their supply of food is more precarious. It appears evident, therefore, that so long as a country remains physically unchanged, the numbers of its animal population cannot materially increase. If one species does so, some

others requiring the same kind of food must diminish in proportion. The numbers that die annually must be immense; and as the individual existence of each animal depends upon itself, those that die must be the weakest—the very young, the aged, and the diseased,—while those that prolong their existence can only be the most perfect in health and vigour—those who are best able to obtain food regularly, and avoid their numerous enemies. It is, as we commenced by remarking, "a struggle for existence," in which the weakest and least perfectly organized must always succumb.

Now it is clear that what takes place among the individuals of a species must also occur among the several allied species of a group,—*viz.*, that those which are best adapted to obtain a regular supply of food, and to defend themselves against the attacks of their enemies and the vicissitudes of the seasons, must necessarily obtain and preserve a superiority in population; while those species which from some defect of power or organization are the least capable of counteracting the vicissitudes of food, supply, &c., must diminish in numbers, and, in extreme cases, become altogether extinct. Between these extremes the species will present various degrees of capacity for ensuring the means of preserving life; and it is thus we account for the abundance or rarity of species. Our ignorance will generally prevent us from accurately tracing the effects to their causes; but could we become perfectly acquainted with the organization and habits of the various species of animals, and could we measure the capacity of each for performing the different acts necessary to its safety and existence under all the varying circumstances by which it is surrounded, we might be able even to calculate the proportionate abundance of individuals which is the necessary result.

If now we have succeeded in establishing these two points—1st, *that the animal population of a country is generally stationary, being kept down by a periodical deficiency of food, and other checks;* and, 2nd, *that the comparative abundance or scarcity of the individuals of the several species is entirely due to their organization and resulting habits, which, rendering it more difficult to procure a regular supply of food and to provide for their personal safety in some cases than in others, can only be balanced by a difference in the population which have to exist in a given area*—we shall be in a condition to proceed to the consideration of *varieties*, to which the preceding remarks have a direct and very important application.

Most or perhaps all the variations from the typical form of a species must have some definite effect, however slight, on the habits or

capacities of the individuals. Even a change of colour might, by rendering them more or less distinguishable, affect their safety; a greater or less development of hair might modify their habits. More important changes, such as an increase in the power or dimensions of the limbs or any of the external organs, would more or less affect their mode of procuring food or the range of country which they inhabit. It is also evident that most changes would affect, either favourably or adversely, the powers of prolonging existence. An antelope with shorter or weaker legs must necessarily suffer more from the attacks of the feline Carnivora; the passenger pigeon with less powerful wings would sooner or later be affected in its powers of procuring a regular supply of food; and in both cases the result must necessarily be a diminution of the population of the modified species. If, on the other hand, any species should produce a variety having slightly increased powers of preserving existence, that variety must inevitably in time acquire a superiority in numbers. These results must follow as surely as old age, intemperance, or scarcity of food produce an increased mortality. In both cases there may be many individual exceptions; but on the average the rule will invariably be found to hold good. All varieties will therefore fall into two classes —those which under the same conditions would never reach the population of the parent species, and those which would in time obtain and keep a numerical superiority. Now, let some alteration of physical conditions occur in the district—a long period of drought, a destruction of vegetation by locusts, the irruption of some new carnivorous animal seeking "pastures new"—any change in fact tending to render existence more difficult to the species in question, and tasking its utmost powers to avoid complete extermination; it is evident that, of all the individuals composing the species, those forming the least numerous and most feebly organized variety would suffer first, and, were the pressure severe, must soon become extinct. The same causes continuing in action, the parent species would next suffer, would gradually diminish in numbers, and with a recurrence of similar unfavourable conditions might also become extinct. The superior variety would then alone remain, and on a return to favourable circumstances would rapidly increase in numbers and occupy the place of the extinct species and variety.

The *variety* would now have replaced the *species*, of which it would be a more perfectly developed and more highly organised form. It would be in all respects better adapted to secure its safety, and to prolong its individual existence and that of the race. Such a variety *could*

not return to the original form; for that form is an inferior one, and could never compete with it for existence. Granted, therefore a "tendency" to reproduce the original type of the species, still the variety must ever remain preponderant in numbers, and under adverse physical conditions *again alone survive.* But this new, improved, and populous race might itself, in course of time, give rise to new varieties, exhibiting several diverging modifications of form, any of which, tending to increase the facilities for preserving existence, must, by the same general law, in their turn become predominant. Here, then, we have *progression and continued divergence* deduced from the general laws which regulate the existence of animals in a state of nature, and from the undisputed fact that varieties do frequently occur. It is not, however, contended that this result would be invariable; a change of physical conditions in the district might at times materially modify it, rendering the race which had been the most capable of supporting existence under the former conditions now the least so, and even causing the extinction of the newer, and for a time superior, race, while the old or parent species and its first inferior varieties continued to flourish. Variations in unimportant parts might also occur, having no perceptible effect on the life-preserving powers; and the varieties so furnished might run a course parallel with the parent species, either giving rise to further variations or returning to the former type. All we argue for is, that certain varieties have a tendency to maintain their existence longer than the original species, and this tendency must make itself felt; for though the doctrine of chances or averages can never be trusted to on a limited scale, yet, if applied to high numbers, the results come nearer to what theory demands, and, as we approach to an infinity of examples, become strictly accurate. Now the scale on which nature works is so vast—the numbers of individuals and periods of time with which she deals approach so near to infinity, that any cause, however slight, and however liable to be veiled and counteracted by accidental circumstances, must in the end produce its full legitimate results.

Let us now turn to domesticated animals, and inquire how varieties produced among them are affected by the principles here enunciated. The essential difference in the condition of wild and domestic animals is this,—that among the former, their well-being and very existence depend upon the full exercise and healthy condition of all their senses and physical powers, whereas, among the latter, these are only partially exercised, and in some cases are absolutely unused. A wild animal has to search, and often to labour, for every mouthful of food

—to exercise sight, hearing, and smell in seeking it, and in avoiding dangers, in procuring shelter from the inclemency of the seasons, and in providing for the subsistence and safety of its offspring. There is no muscle of its body that is not called into daily and hourly activity; there is no sense or faculty that is not strengthened by continual exercise. The domestic animal, on the other hand, has food provided for it, is sheltered, and often confined, to guard it against the vicissitudes of the seasons, is carefully secured from the attacks of its natural enemies, and seldom even rears its young without human assistance. Half of its senses and faculties are quite useless; and the other half are but occasionally called into feeble exercise, while even its muscular system is only irregularly called into action.

Now when a variety of such an animal occurs, having increased power or capacity in any organ or sense, such increase is totally useless, is never called into action, and may even exist without the animal ever becoming aware of it. In the wild animal, on the contrary, all its faculties and powers being brought into full action for the necessities of existence, any increase becomes immediately available, is strengthened by exercise, and must even slightly modify the food, the habits, and the whole economy of the race. It creates as it were a new animal, one of superior powers, and which will necessarily increase in numbers and outlive those inferior to it.

Again, in the domesticated animal all variations have an equal chance of continuance; and those which would decidedly render a wild animal unable to compete with its fellows and continue its existence are no disadvantage whatever in a state of domesticity. Our quickly fattening pigs, short-legged sheep, pouter pigeons and poodle dogs could never have come into existence in a state of nature, because the very first step towards such inferior forms would have led to the rapid extinction of the race; still less could they now exist in competition with their wild allies. The great speed but slight endurance of the race horse, the unwieldy strength of the ploughman's team, would both be useless in a state of nature. If turned wild on the pampas, such animals would probably soon become extinct, or under favourable circumstances might each lose those extreme qualities which would never be called into action, and in a few generations would revert to a common type, which must be that in which the various powers and faculties are so proportioned to each other as to be best adapted to procure food and secure safety,—that in which by the full exercise of every part of his organization the animal can alone continue to live. Domestic varieties, when turned wild, *must* return to something

near the type of the original wild stock, *or become altogether extinct.*

We see, then, that no inferences as to varieties in a state of nature can be deduced from the observation of those occurring among domestic animals. The two are so much opposed to each other in every circumstance of their existence, that what applies to the one is almost sure not to apply to the other. Domestic animals are abnormal, irregular, artificial; they are subject to varieties which never occur and never can occur in a state of nature: their very existence depends altogether on human care; so far are many of them removed from that just proportion of faculties, that true balance of organization, by means of which alone an animal left to its own resources can preserve its existence and continue its race.

The hypothesis of Lamarck—that progressive changes in species have been produced by the attempts of animals to increase the development of their own organs, and thus modify their structure and habits—has been repeatedly and easily refuted by all writers on the subject of varieties and species, and it seems to have been considered that when this was done the whole question has been finally settled; but the view here developed renders such an hypothesis quite unnecessary, by showing that similar results must be produced by the action of principles constantly at work in nature. The powerful retractile talons of the falcon and the cat tribes have not been produced or increased by the volition of those animals; but among the different varieties which occurred in the earlier and less highly organized forms of these groups, *those always survived longest which had the greatest facilities for seizing their prey.* Neither did the giraffe acquire its long neck by desiring to reach the foliage of the more lofty shrubs, and constantly stretching its neck for the purpose, but because any varieties which occurred among its anti-types with a longer neck than usual *at once secured a fresh range of pasture over the same ground as their shorter-necked companions, and on the first scarcity of food were thereby enabled to outlive them.* Even the peculiar colours of many animals, especially insects, so closely resembling the soil or the leaves or the trunks on which they habitually reside, are explained on the same principle; for though in the course of ages varieties of many tints may have occurred, *yet those races having colours best adapted to concealment from their enemies would inevitably survive the longest.* We have also here an acting cause to account for that balance so often observed in nature,—a deficiency in one set of organs always being compensated by an increased development of some others—powerful wings

accompanying weak feet, or great velocity making up for the absence of defensive weapons; for it has been shown that all varieties in which an unbalanced deficiency occurred could not long continue their existence. The action of this principle is exactly like that of the centrifugal governor of the steam engine, which checks and corrects any irregularities almost before they become evident; and in like manner no unbalanced deficiency in the animal kingdom can ever reach any conspicuous magnitude, because it would make itself felt at the very first step, by rendering existence difficult and extinction almost sure soon to follow. An origin such as is here advocated will also agree with the peculiar character of the modifications of form and structure which obtain in organized beings—the many lines of divergence from a central type, the increasing efficiency and power of a particular organ through a succession of allied species, and the remarkable persistence of unimportant parts, such as colour, texture of plumage and hair, form of horns or crests, through a series of species differing considerably in more essential characters. It also furnishes us with a reason for that "more specialized structure" which Professor Owen states to be a characteristic of recent compared with extinct forms, and which would evidently be the result of the progressive modification of any organ applied to a special purpose in the animal economy.

We believe we have now shown that there is a tendency in nature to the continued progression of certain classes of *varieties* further and further from the original type—a progression to which there appears no reason to assign any definite limits—and that the same principle which produces this result in a state of nature will also explain why domestic varieties have a tendency to revert to the original type. This progression, by minute steps, in various directions, but always checked and balanced by the necessary conditions, subject to which alone existence can be preserved, may, it is believed, be followed out so as to agree with all the phenomena presented by organized beings, their extinction and succession in past ages, and all the extraordinary modifications of form, instinct, and habits which they exhibit.

A. R. Wallace.

Ternate, February, 1858.

Weasel carrying its Young.—On the 18th of September I saw a weasel run across the road, with a young one in its mouth, apparently about a month old. I write these particulars as I think it is not generally known that weasels do so carry their young ones.—*Howard Fox; Falmouth, October* 13, 1858.

Occurrence of Crossbills in Yorkshire.—Last week nine crossbills (*L. curvirostra*) were killed, out of a flock of eleven, about nine miles above Richmond. They had constantly frequented the fir plantation in which they were killed, since last February, and had they remained undisturbed I think it quite possible that they would have bred there this winter.—*H. Smurthwaite; Bank, Richmond, Yorkshire, November* 2, 1858.

Remarkable Anecdote of the Cuckoo.—At the village of Tickenhall, in Derbyshire, lime is procured for agricultural purposes, which, of course, every time it is blasted makes a great noise. Notwithstanding all the noise and bustle attendant upon the operations of procuring it, a small bird built its nest close by a bush which grew upon a rough bank. The egg of a cuckoo was laid in it in due time, and eventually hatched. The young cuckoo did not seem at all frightened by what was going on around it. When fully fledged, a friend of mine took it, and gave it to his little boy to make a pet of. It lived upon eggs, caterpillars, flies, insects of various kinds, and raw beef, and throve remarkably well. It was pinioned, and allowed to roam about the orchards and neighbouring fields, and grew tame. One day, however, it was missing, and was away a whole month. It was found, however, within a few fields of the house, and, singular to say, several little wild birds were in the act of feeding it. The operation was watched for some time with much interest. It seems very remarkable that having been in partial confinement for perhaps three weeks or a month, the birds should feed it. It would almost lead one to think that in the cuckoo existed something peculiar and attractive which induced other birds to take it under their protection.—*John Joseph Briggs in 'The Field.'*

The Creamcoloured Courser in Hackney Marshes.—I am indebted to Mr. Cooper, of No. 28, Radnor Street, St. Luke's, for sending me, in the flesh, a very perfect female specimen of that rare bird the Cursorius isabellinus of naturalists. It was shot in the Hackney Marshes, on the 19th of October, by Mr. George Beresford, of the White House Fishery. The bird was exceedingly tame, probably tired with a long flight. The last recorded instance of the occurrence of this bird in Britain is in the 'Zoologist' for 1855 (Zool. 4913). The specimen was shot by Mr. Walter Langton, on East Down, Salisbury Plain, on the 2nd of October, 1855. Mr. Langton was following a wild covey of partridges which had pitched on the open down, when his dogs stood at this bird; it rose, flew about a hundred yards, and settled again. He followed it, and finally shot it on the ground. The late Mr. Yarrell saw and handled the bird in the flesh; I had the same pleasure. Mr. Cooper will be pleased to show his more recent specimen to any gentleman who inclines to call on him at the above address.—*Edward Newman in 'The Field.'*

Appearance of Skuas off the Coast of Yarmouth.—During the past month, several fine specimens of the common skua, mostly in adult plumage, have been killed off Yarmouth, as well as six specimens of Richardson's and one pomarine skua. Of Richardson's skuas three were in the immature plumage of the second year, an uniform

brownish tint, with the middle tail feathers projecting about three inches, and the others had attained very nearly their adult state, the under parts being white with the exception of a few dusky markings remaining more or less on the throat and breast: in this plumage they are very rarely met with on this coast. The single pomarine specimen that I examined was also in rapid progress to maturity, the whole of the under surface of the body being mottled with white and dusky brown. All these birds were shot from the boats engaged in the herring fishery, as the skuas, like the common gulls, follow up the shoals of fish as they approach our shores, but not with the same honest intention of gaining their own living as their kindred species, whom they too often bully out of their well-earned meal, as the sea eagle pounces on the osprey.—*H. Stevenson; Norwich, November* 6, 1858,

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Colias Edusa near London.—On Wednesday, October 27th, I took a fine male specimen of Colias Edusa in my garden, apparently fresh from the chrysalis. I have recorded this fact, thinking it somewhat remarkable in this locality, so near London. Since writing the above my son has taken another specimen of C. Edusa in the Camden Road, leading to the villas.—*Joshua Dix;* 29, *St. Paul's Road, Camden Square, N.W., October* 30, 1858.

[Many other instances have occurred within the last fortnight, but I have not room for them.—*E. Newman.*]

On the Food plant of Polyommatus Artaxerxes and P. Agestis.—Much has been stated by Mr. Logan and Mr. Wailes (Zool. 6276 and 6278) to prove that P. Agestis feeds on the Helianthemum; facts prove to me the contrary. That the perfect insects frequent the blossoms of that plant I do not dispute, but this does not prove that the larvæ feed on it. Now for a fact or two: the Deal sands (a tract of waste land about five miles in length by half a mile in width), from one end to the other, is a great station for Erodium cicutarium; here P. Agestis may be found in hundreds, and it is here that I take the larvæ. These sands are adjoining marshes of some miles in extent, on which there is no Helianthemum at all: leaving this part of the country, and travelling inland, we shall find the Helianthemum in abundance, and P. Agestis is quite wanting, or very rare. Another instance: at Dartford Heath, in Kent, the Erodium is found in some plenty; here P. Agestis may be found also; but the Helianthemum is rare on the Heath. Again, on the sides of Darenth Wood the Helianthemum grows in abundance; here but one or two of P. Agestis have been found, and they had evidently got astray. On the sand-hills P. Agestis and the common blue keep company; so fond are they of the Ammophila arundinacea that these two species are always found sitting on it to rest at night and flying among it by day, and one might arrive at the conclusion that it is their food-plant: seldom are they found on their food-plant, the Erodium. It is well known that the common blue settles on the common rush, but that does not prove it is their food-plant. The reason why P. Artaxerxes is found in such numbers on Arthur's Seat is because it is a great station for Helianthemum vulgare. Mr. Logan says P. Agestis is as much attached to the Helianthemum as to the Erodium: I think these facts prove the contrary; or why is not P. Agestis found in plenty where the Helianthemum grows in abundance? Again, I am informed by Mr. Logan that the larva of P. Artaxerxes will spin up against the face of a rock or in confinement: I have bred a great number of P. Agestis,

and have never found one so inclined. Does this not again prove the two species, by the difference of habitat of the larva? I should much like to see a larva of P. Agestis feeding on the Helianthemum: who has ever found one?—*H. J. Harding;* 1, *York Street, Church Street, Shoreditch.*

[I agree with Mr. Harding that the fact of an insect settling on the blossoms of a plant prove nothing as to the food of the larva: Sphinx Convolvuli obtained its name from the propensity of the imago to suck the honey of tubular flowers, but the conclusion was a most rash one, and has led hundreds to seek the larvæ among the leaves of the bindweed.—*E. Newman.*]

Double-broodedness of the Notodontidæ.—The observations of Mr. Newman and Mr. Boyd (Zool. 6281, 6283) on my paper on the "Double-broodedness of the Notodontidæ" (Zool. 6248) appear to have been written under an entire misapprehension. It is evident that both these gentlemen have the impression that the experiments with Pterostoma palpina and Notodonta dictæa commenced in May, 1858, and terminated with the larva in August of the same year. If I am correct in this supposition, they are in error on both points; they have overlooked the fact that the communication alluded to is a continuation of one published in the 'Zoologist' (Zool. 5826). These experiments commenced in August, 1857, with larva, and concluded in August, 1858, with the ova, embracing a period of twelve months, and carrying both insects through two entire cycles of life. I further mentioned, "almost parenthetically," that I had commenced a third cycle,—that is, that I had larvæ again feeding; this latter observation, however, was only made to show that the last state of the second cycle was complete,—namely, that the eggs had proved fertile,—but beyond this I attached no value to it whatever; these larvæ formed no part of my experiments, the two cycles were complete without them. Mr. Newman introduces Acherontia Atropos as an insect which he says I should consider double-brooded; on the contrary, this insect is entirely single-brooded, according to the rule laid down by Mr. Newman himself, and with which I fully agree: with Atropos no one of the four states occurs more than once in the twelve months; indeed, necessarily, if one state occurs more than once all must: it is true that individuals of this insect appear in autumn, the remainder in spring, but it is only an irregular, prolonged development from the same set,—namely the autumn-formed pupæ. Will Mr. Newman say from which of my papers he gathered that the divided or prolonged appearance of imago from the same set of pupæ was considered by me as evidence of double-broodedness? Mr. Newman further says that the "state of pupa (of A. Atropos) occurs twice." Now this may be said of every insect whose pupa continues in that state from autumn till spring, and although it may thus be found at two periods of a calendar year, it is only formed once in the four seasons, or twelve months. This insect has only one cycle of life in a natural year: the appearance of the imago in autumn is premature, and the individuals barren, dozens have been opened in this town during this autumn proving this fact. Mr. Newman again says "But even supposing the two cycles of existence were completed by a Notodonta in 1858" (meaning, I suppose, twelve months) "still the temperature of the past season having been abnormal the rapid progress of insect transformation may have been abnormal also." I hope this is the *dernier resort* of dying doubt; he appears to forget that my experiments with N. ziczac, which produced the same results as those with N. dictæa and P. palpina, were carried on during the years 1856 and 1857.

Boyd says, "I hope Mr. Gascoyne will publish the results of his experiments when the cycle is complete." I have before shown that the double cycle was com-

pleted with the second production of ova. I will just recapitulate the experiments with P. palpina and N. dictæa, showing the two cycles, taking the dates roughly. Larva fed up September, 1857 ; pupæ remained through the winter ; moths emerged in May, 1858 ; these laid eggs which hatched in June and proved fertile : this forms the first cycle. Larva began to feed in June and buried at the end of that month and early in July ; moths appeared about the beginning of August ; eggs from these hatched in about ten days: this completes the second cycle, and here ended the experiments. I may add that the larvæ from these duly fed up, and the pupæ of both P. palpina and N. dictæa are now taking their winter repose.—*G. Gascoyne ; Newark, November* 4, 1858.

[Invited by Mr. Gascoyne to enter into further explanations, it is from no want of courtesy that I decline, but simply because I possess no additional facts to lay before my readers: my interpretation of Mr. Gascoyne's views may have been erroneous ; at any rate he is their best interpreter. One word as to "exceptional" summers, the term applies equally to 1857 and 1858 ; in both the temperature was "exceptionally" high.—*Edward Newman.*]

Occurrence of Glæa erythrocephala on the South Coast.— My friend Mr. Wright has just brought to this office a specimen of this rarity, taken last night by himself at sugar on the south coast ; two others were taken by a companion at the same time and place.—*Edward Newman ; November* 2, 1858.

Occurrence of Camptogramma fluviata near Worthing.—I captured a splendid male of this insect, in the middle of October, near Worthing, Sussex. It seems to be a widely distributed species, and to occur throughout the summer and autumn months. —*H. Tompkins ;* 44, *Guildford Street, Russell Square, London, November* 5, 1858.

A new Nepticula.—There is a species of Nepticula now in the larva state in apple-leaves, which I have repeatedly met with and reared. It does not seem to be as yet described ; a brief account of it may therefore be interesting, and I would propose the name Pomella. The egg is deposited on the under side of apple-leaves ; the larva, when hatched, mines in the upper cuticle, and usually in the direction of the stem, forming a slender track, which turns pink, and betrays the presence of a larva in the leaf before it is visible to the naked eye ; this track is frequently close to a rib ; as the mine becomes wider it is orange-coloured, with irregular tracks of brownish excrement : it is never very conspicuous from above, but quite invisible on the under side ; after a time the larva commonly doubles on its track, and forms a blotch, from which it emerges on the upper side to wander away and form its cocoon. The larva is very shining, orange-coloured, with dorsal vessel only slightly darker ; head pale chestnut. The cocoon varies from dark chestnut to bright orange : it is slightly mussel-shaped, and always has a rim of much brighter hue round the upper end, which gives it a striking appearance ; the pupa is protruded on the escape of the perfect insect. The imago expands about three lines, and is of the unicolorous group ; the anterior wings cinereous, glossy, and with a purple hue, brightest towards the apex ; the posterior wings of an uniform paler colour ; head rufous with whitish eye-caps. In the perfect state it is closely allied to N. pygmæella. It is double-brooded, appearing in May and August, the larva occurring in July, October and November ; the July larva seems very scarce,—I observed them this July for the first time ; the autumnal larvæ are by no means rare in the neighbourhood of Bristol.—*P. H. Vaughan ; Redlands, Bristol, October* 29, 1858 —'*Intelligencer.*'

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