

Letters on Variation in Lepidoptera. By EDWARD NEWMAN.

LETTER THE THIRD.—PAIRS OF SPECIES.

My dear Mr. Wollaston,—

My third epistle treats of a matter which has already caused much discussion, and will certainly cause much more before it is finally accepted or rejected by our fellow-labourers in the field of Science—I allude to the existence of *pairs* of species: and here I wish expressly to state that I employ the word “species” in its conventional and ordinary sense, and leave it a perfectly open question for future discussion, whether the moieties of the pairs to which I shall allude are species, races or varieties, or whether species have any absolute existence in Nature. Such questions are here avoided, because, however interesting and important as regards the science of Natural History, they would rather encumber and confuse the few simple views I am now endeavouring to express; but to my point.

It cannot escape the notice of the inquirer that natural groups of organized beings exhibit a tendency to a dichotomous division: this phenomenon is of frequent occurrence. Dr. Fleming, whose profound teachings in Zoology have never been sufficiently esteemed, was the first to point out the existence of this tendency; his only mistake was in assuming that a phenomenon which he saw so plainly portrayed on Nature’s face must involve the existence of an absolute law: he believed that all Nature’s laws were general; he carefully studied the seen, and imagined the unseen to be in exact accordance: now we may accept the axiom of the poet that Nature

“Acts not by partial but by general laws,”

without assuming that we possess a perfect knowledge of those laws; for instance, exceptions to natural laws may be of such frequent occurrence as to become laws themselves: it is an undoubted law that the females of our own race produce but one young one at a birth, nevertheless an exception occurs quite as regularly, that once in a certain number of births twins shall be produced: the exception by no means vitiates the rule; indeed, in my estimation, it would tend to establish the rule, but the exception must be regarded as having the same force as the rule which it contravenes, and must never be disregarded in our calculations or superseded by our inventions.

A few instances of these dichotomies at once force themselves on our notice. In the first place, organized beings are either animals or plants, and although we constantly meet with learned lecturers who raise objections to this obvious truism, and skilfully place a stumbling-block in their own way just to exhibit their ability to remove it, Nature takes no heed of their proceedings, but writes "plant" and "animal" on the forehead of each in characters so unmistakably plain that he who runs may read. The lecturer may talk of chemical tests, of the test of burning; he may immerse atoms in aquafortis or subject them to a white heat in order to ascertain their true character; it is all to little purpose, and we accept Nature's inscription in preference, and leave the lecturer to his experiments and his speculations.

I am often taught by the simple remarks of children how much of our labour is in vain. Sometimes I spend an hour or two in Regent's Park, where animals and plants have each their allotment of acres. One Thursday a learned professor at the Royal Botanic explained at great length the necessity of applying tests in distinguishing animals from plants; and a little boy who was my companion seemed

"To drink instruction with delighted ear."

We adjourned to the Zoo, where my juvenile friend enjoyed a ride on the elephant, and some time after he had dismounted he asked me, in perfect simplicity, "Mr. Newman, is the elephant an animal or a plant?" I saw of course what was going on in his juvenile brain, and told my youthful friend that in the case of such large creatures as elephants there could be no doubt; that we recognized them at once, instinctively, intuitively, and a little more in the same sagacious strain, and so I thought the matter was settled; but I could not escape so readily as this: when we reached the giraffes the subject was renewed by the inquiry, "Have the giraffes been calcined?" "No, certainly not, or we should not see them poking their noses almost in our faces as they are doing now." "Then you can't be *quite certain* whether they are plants or animals: Professor Smokey said so just now." I got out of the hobble as well as I could, but with a steadfast resolution never to take a child to hear another scientific lecturer. Nature herself was this boy's best instructor; philosophy only served to lead him astray. Animals and plants then are one of Nature's pairs, which even the learning of a professor will not serve to divorce.

The reptiles afford us another instance of a natural dichotomy. Cuvier, the great apostle of our Science, regarded sucklers, birds,

reptiles and fishes, as four equivalent classes of endosteate animals, but subsequent writers have divided the reptiles into two classes, first to gratify a fiction, once fashionable, that Nature prefers the number five, and, secondly and more remotely, because there was an intrinsic difference in their mode of reproduction: this difference is a true one, but I have shown elsewhere that it obtains also in sucklers, birds and fishes.* The difference is most strongly pronounced in fishes: it has its second degree of development in reptiles; its third in birds; and its fourth in sucklers. It is very interesting to observe how beautifully similarities develop themselves in the component parts of these dichotomous divisions as soon as this principle is understood: it is only necessary to glance at a lizard and a salamander, both comprised by Linneus in the genus *Lacerta*, but totally different in physiological characters, to appreciate and understand the whole theory of pairs. Two beings enter on life side by side, totally different from each other, and having a different external form, a different system of circulation and respiration, eating different food, the one aquatic, the other terrestrial, yet approaching each other hour by hour, week by week, until they become, in the estimation of a Linneus, members of the same genus, *Lacerta*.

It is exactly thus amongst insects; they commence life differently and end it alike, so truly alike that it is the pleasure, I may say the vocation, of some entomologists, to insist they are identical; and in those few instances in which this assertion is not made, as in the case of *Psi* and *trideus*, it is because these have, from long custom, acquired a prescriptive right to specific rank, not because any specific diagnosis has ever been proposed.

These natural dichotomies contrast in the most striking manner with scientific dichotomies, of which there is none more popular than those consisting of a positive and a negative; even such dichotomies are truthful but vague, like the poet's division of the world into two moieties:

“The one that small
Beloved and consecrated spot
Where Leah was, the other all
The dull wide waste where she was not.”

One moiety will be acknowledged to be clear and definite, the other vague, indefinite, and somewhat too comprehensive for our just apprehension.

* ‘Essay on the Physiological Classification of Animals.’ Van Voorst, 1852.

Of these false, or as they are termed scientific, dichotomies there are two preeminently popular. By this principle Lepidoptera are divided into Rhopalocera and *Heterocera*; animals into vertebrate and *invertebrate*. Let us glance at these dichotomies only for a moment. *First*, that of Lepidoptera into Rhopalocera and *Heterocera*,—Rhopalocera conveys in its very name the expression of a character, and *Heterocera* equally implying the want of a character. *Secondly*, an exactly parallel instance is the dichotomous division of animals into vertebrate and *invertebrate*; the *haute école* of Science roll out these terms with great power of voice and immeasurable self-complaisance; but Nature fails to acknowledge them: as well might we divide animals into hairy and *not-hairy*, or feathered and *not-feathered*: such terms as *vertebrate*, *hairy* and *feathered* express positive characters, but no group can be based on the *non-possession* of these characters—a fact that must be only too obvious to every one who gives the subject a fair share of consideration.

Not only do these dichotomies, founded on a positive and a negative, find no support in Nature, but they have another fault equally embarrassing to the student: they give a measure—a small but notable measure—of character to one moiety of the pair, yet leave the other moiety a perfect chaos, and do not afford us the slightest clew to the arrangement or subdivision of its contents.

Now exactly such dichotomies as we find in kingdoms—I accept the term as prescriptive, not for its merits—exactly such do we find in all minor divisions known as provinces, classes, orders, families, genera and so forth, until we arrive at those species where the present inquiry properly begins; and here I would extend a word of caution to those who really desire to investigate the subject: let no one assume the universality of the law, since all that can be done in our present state of ignorance is to follow out these dichotomies where we see traces of their existence, and thus acquire such an amount of knowledge as shall dissipate that ignorance, and it is of the utmost importance that we take nothing for granted, that we assume nothing, that we test everything by repeated experiment.

I will select half a score examples from as many families to illustrate my meaning, and bring it more immediately under the notice of my readers, and I wish to invite especial attention to the fact that the moieties of each pair are produced under precisely parallel circumstances; that climatal or geographical or seasonal conditions have no influence over them; that they may be produced at the same hour,

may feed on the same leaf, and may never wander from the same garden. I do not say that these conditions are necessary, but merely that the pairs will unquestionably bear the test of the most rigid restrictions to similar conditions. The examples I select are by no means the best I could find. No. 1 I have chosen on account of a peculiar interest attached to the discovery; the other nine because the abundance of the individuals in each case affords the inquirer such ample opportunity of testing the soundness of my views.

1. *Bombyx Spartii* and *B. familiaris*.—During the summer which has just passed away my friend Mr. Doubleday sent me the larva of a *Bombyx* which he had received from the Continent under the name of *B. Spartii*, which was totally different from any larva I had previously seen: M. Guenée had previously described both the larva and imago of *Bombyx Spartii*, and this was the larva in question. Hübner had previously figured the imago: Boisduval had both figured and described it; and Herrich-Schæffer describes it in his 'Systematische.' Our countryman Stephens makes five British species out of the section of *Bombyx* now under consideration, three of which, *Rubi*, *Trifolii* and *Quercus*, he considers good and veritable species; two others, *Medicaginis* and *Roboris*, he places within brackets, thus implying a doubt whether they be really species; under *Roboris* we find the *Bombyx Spartii* given as a variety, with references to Hübner's figures of both sexes: thus it appears from this, that Mr. Stephens, the most species-making of all entomologists, raises *Bombyx Spartii* to no higher rank than the variety of a variety, and it may be added that no permanent character has been pointed out whereby its imago can be distinguished from that of the insect I have next to notice.

Bombyx familiaris is a new name: it was *Bombyx Quercus*, and also familiarly known in England as the "Great Oak Eggar." The reason for the change of name is simply this, that our familiar insect is not the *Bombyx Quercus* of Linneus: we all know from the original description, from the habitat and from the Linnean specimen still extant, that the name of *Quercus* belongs of right to the insect we have within the last dozen years rechristened under the name of *Callunæ*.

The larvæ of *Spartii*, to which I have just alluded as received by Mr. Doubleday from France, underwent their metamorphosis and emerged as perfect insects in all respects identical with our *familiaris*. The larvæ are totally distinct, the moths perfectly identical.

In this as well as in the instances which follow, we must adopt one or the other of these two conclusions: *first*, that two perfectly distinct

species of larva are required to constitute one species of imago; or, *secondly*, that two species of Lepidoptera, entirely different in their preparatory stages, become precisely similar in their adult state. I accept the latter conclusion, and fully believe that pairs of species may in a thousand instances be so exactly alike in the imago state as to defy every effort to differentiate them. To all human perception this pair of species, when examined in their ultimate state, are absolutely identical.

2. *Boarmia rhomboidaria* and *B. perfumaria*.—I have had the pleasure of minutely examining, and most carefully describing, the larvæ of these two species. The differences between the two possess the invaluable attribute of constancy; neither ventures over its natural boundary line, whether in form, colour or food. Arrived at maturity, their similarity is so great that entomologists generally refuse to perceive any difference between them; but I cannot go quite so far as to say that none exists: those who like myself have repeatedly bred both from the egg, and closely scrutinized the adults as they entered on their winged existence, have observed differences which at the moment seemed to separate them, although soon to be lost after the moths have taken wing. The rhomboidaria of the Vienna Catalogue, of Hübner, Haworth, Duponchel, Guenée, &c., is correctly described by Guenée as *cedré-jaunâtre*, the dark cinereous ground-colour of the wings is suffused with a yellowish tint, while in the rhomboidaria of Stephens the colour is more uniformly cinereous and without any yellow tinge whatever. I should characterize this insect as *very smoky, perfumaria*: in accordance with its metropolitan habitat, it seems to be saturated with smoke: Guenée gives other characters of distinction, although he treats *perfumaria* only as a variety; he says it is a little larger, the fore wings are a little more pointed, and a little more prolonged at the tip; the pectinations of the antennæ are rather longer and are not appressed so closely on each other. Several writers, in a recently-established and highly scientific journal devoted exclusively to Entomology, also allude to both species in a manner that implies perfect familiarity with them.

3. *Cabera pusaria* and *C. rotundaria*.—In this instance we labour under a double difficulty: in the first place, *C. rotundaria*, in all its states, is very imperfectly known; and, in the second place, there is but little inclination exhibited to acquire a more perfect knowledge. In almost every cabinet certain individual insects are set apart from *Cabera pusaria* and are labelled “*rotundaria*.” Haworth was the first

to characterize *Rotundaria* thus—" *Alis rotundatis albis fusco-subatomosis, strigis duabus medio communibus subundulatis plumbescentibus antica anticarum geminata.*" He gives no *descriptio*, and entirely omits all reference to *Pusaria*, which follows next in order, and under which, in like manner, there is no reference to *Rotundaria*: his character of *Pusaria* runs thus—" *Alis albis fusco-subatomosis strigis tribus medio æquidistantibus, subundulatis plumbescentibus ultimis communibus.*" It will be seen that the anterior striga on the fore wings of *Rotundaria* is double: at p. 85 of my 'British Moths' this character is well shown in two of the figures; in the other two there are but two strigæ, and neither of these is double; but this character occurs also in *Pusaria*, some specimens having one double and one single striga, others two single strigæ; the roundness of the wings therefore remains as the only constant and reliable character. Herrich-Schæffer dismisses *Rotundaria* without the slightest hesitation as one of the synonyms of *Pusaria*. Freyer (pl. 60, fig. a) figures *Rotundaria* as a species under the name of *Confinaria*. Lastly, Guenée (*Uran. et Phal.* ii. 55) admits *Rotundaria* as a species with a doubt implied, but suppressed on the assurance that the larva of *Rotundaria* "had lately been reared in great numbers in England, and was found to be entirely different from that of *Pusaria*." This passage alludes to a discovery of Mr. Machin's. I have never been so fortunate as to see the larva of *Pusaria*, but I believe Mr. Machin's view of the entire difference of the larva is now generally accepted.

4. *Eupithecia linariata* and *E. pulchellata*.—The larva of *E. linariata* occurs commonly feeding on the blossoms of *Linaria vulgaris* (the common yellow toad-flax); that of *E. pulchellata* is equally common on those of *Digitalis purpurea* (the foxglove): they are totally distinct, as will be seen by a reference to the detailed descriptions, from the pen of Mr. Crewe, in my 'British Moths.' Guenée considers the perfect insects so similar that he would not have given *Pulchellata* as a species had not Mr. Doubleday informed him that he had bred more than a hundred individuals of *Linariata* without meeting with one of *Pulchellata* amongst them. "It is much to be desired," says M. Guenée, "that *Pulchellata* should be bred simultaneously with *Linariata*, so that we might verify its claim to specific rank, a claim concerning which I have always had my doubts." This has been done, and *Pulchellata* is acknowledged to be a species.

5. *Cidaria immanata* and *C. russata*.—These insects are extremely interesting, not only on account of their infinite variation, but also on

account of the parallelism of their variation; that is to say, each exhibits similar variations, while each has also one or more variations peculiar to itself. A brief sketch of the bibliography of these insects, which are almost ubiquitous, may possess some interest.

In 1776 the Vienna Catalogue gives but one species which can be regarded with any certainty as belonging to the group: this is called *Russata*.

In 1792 Fabricius, in his 'Entomologia Systematica,' also gives one only, which is called *Centum-notata*.

In 1803 Haworth combines these under the name *Centum-notata*, but describes four varieties called α , β , γ and δ ; he also adds four other species, which he calls *Immanata*, of which he describes four varieties, α , β , γ and δ ; *Marmorata*, of which he describes three varieties, α , β and γ ; *Perfuscata*, of which he describes three varieties, α , β and γ ; and finally *Comma-notata*, of which he says "Nunquam variat."

In 1829 Mr. Stephens adds three species, *Concinnata*, *Amænata* and *Saturata*, and Mr. Curtis adds a fourth, *Boreata*.

In 1850 Mr. Doubleday, for the first time, divides this formidable array of names into two species:

RUSSATA including		IMMANATA including
Russata	} <i>as synonymous.</i>	Immanata
Centum-notata		Marmorata, <i>as a var.</i>
Comma-notata, <i>as a var.</i>		Amænata, <i>as a var.</i>
Perfuscata, <i>as a var.</i>		
Saturata, <i>as a var.</i>		
Boreata, <i>as a var.</i>		

It will be observed that Mr. Doubleday omits *Concinnata* of Stephens, to which allusion has been made above.

In 1847 Herrich-Schæffer combines these eight described species with four others, *Passeraria*, *Strigulata*, *Truncata* and *Variata*, under the original name of *Russata*, without expressing a doubt as to their constituting but a single species.

In 1857 Guenée endorses this view, giving a long and learned dissertation on the subject; and finally,

In 1862 Mr. Doubleday, in a second edition of his 'Synonymic List,' again separates them, as before, into *Russata* and *Immanata*, and every entomologist in England now follows this master mind and guiding spirit.

Nevertheless much independent and pleasant diversity of opinion obtains in the application of this dichotomous division. On those pleasant evenings when we gather round a friend's cabinet, a discussion like this always arises when the drawer containing *Cidaria russata* is opened for inspection.

1st Critical Visitor. I think these insects are all *Russata*; *Immanata* is a larger insect—it has more the cut of a *Pyrale*, and looks altogether different.

2nd Critical Visitor. I can't agree with you there: *Immanata* is a smaller insect; indeed it seems to me a question of magnitude.

Host. I confess to finding great difficulty in separating them, and to having taken but little trouble about the matter.

3rd Critical Visitor. But I have thought. I think I ought to know the species, if anyone does; I have taken them by thousands. Let me see the drawer. (*Brings his optical focus to bear on the insects.*) You are all wrong here. Ha! ha! ha! I thought as much. In this first row the third, fourth,—no, not the fourth; yes, the fourth,—seventh, eighth and tenth are *Russata*; all the others *Immanata*. Ha! ha! ha! that is a joke! Now for the second row: here they are mixed in the same way; the third, sixth, seventh, ninth, tenth and eleventh are *Immanata*; the rest *Russata*. There is no difficulty in separating them when you once know the species: they are as easy as A B C: ha! ha! ha!

2nd Critical Visitor (taking the drawer and looking over it very intently). I can't agree with you there: I should call the first row all *Russata*, except the third, eighth and ninth—those are *Immanata*; but you have them sadly mixed in the second row. May I take off the glass, and set them right? It's a pity that a cabinet of reference like this should have them wrong.

3rd Critical Visitor. Well, I should not like your naming, Mr. Blank: ha! ha! ha! (*Looks at the drawer again.*) You may be right about the eighth; but I can't give in about the rest. Will you allow *me* to separate them?

Host. No, thank you: Mr. Doubleday has had the kindness to go through them, and has named them as they stand.

The Critics in chorus. Oh, that's a different thing! Well, I should not have named them so; but of course Mr. Doubleday must be right: no one will dispute his authority.

6. *Dicranura Furcula* and *D. bifida*.

7. *Notodonta dictæa* and *N. dictæoides* I believe it possible to separate these two species when in perfect condition; but it is a matter of great difficulty, unless to those who have made the subject their especial study: it seems to me that Haworth was unable to separate them, and that both species are included under his *Bombyx tremula*: the distinction between the two has not been made perfectly clear to my apprehension by the descriptions, yet so early as the time of Linneus two species were recognized, *Bombyx dictæa* and *B. tremulus*; but Haworth combines these names under that of *Tremulus*, and Doubleday under that of *Dictæa*: it is quite possible that it was intended thus to denominate the *N. dictæa* and *N. dictæoides* of our modern nomenclature. Be this as it may, the similarity of the two species is really marvellous, and nothing but a perfect knowledge of their larvæ could induce anyone to separate them: through the kindness of friends I have been supplied with the larvæ of both, and have described them with care; they are abundantly distinct, and cannot be combined, unless by the admission of the hypothesis, hitherto universally rejected, that there may exist permanent variations in the larva parallel to those hitherto supposed to be confined to the imago.

8. *Acronycta Psi* and *A. tridens*.—In this case the exact similarity of the two perfect insects is admitted on all hands. Haworth says of *Tridens*, "Too much like the preceding (*Psi*), and almost the same, but has a different larva." Haworth, however, in attempting their differentiation falls into a very common error: he says, "The colours (of *Tridens*) are always paler; the hind wings are whitish or white:" thus apparently referring to the males of both species. The larvæ are entirely different, and I have taken great pains to describe both from nature.

9. *Noctua festiva* and *N. conflua*.—Here we have a pair which Guenée separates by an intervening species (*Noctua collina*): he makes no allusion to the similarity of the two, but quotes the Vienna Catalogue, Hübner, Haworth, Treitschke and Godart as the authorities for the one; Treitschke, Freyer, Duponchel, Boisduval and Herrich-Schæffer as authorities for the other: I possess a fair series of both; they vary infinitely, and vary almost precisely in the same way, exhibiting similar colours and similar markings in their variation; yet there is no character, so far as I can ascertain, that belongs exclusively to either, and I have never yet met with an entomologist who, after inspecting my series, was perfectly convinced of their distinctness.

Still it appears that Guenée could detect a single specimen in Boisduval's cabinet mixed with his series of *Festiva*. The larva of *Festiva* is figured by Hübner, that of *Conflua* by Millière, and I have had the pleasure of writing descriptions of both: the discrepancies between them convince me they are perfectly distinct, and I believe that I could, without fail, separate a mixed series of the perfect insect into their respective species.

10. *Cucullia Verbasci* and *C. Scrophulariæ*.—Haworth does not appear to me to have been happy in differentiating these two insects; he describes the hind wings of the male *Scrophulariæ* as “albidæ non albæ,” and as having the fringe “brown not black.” These distinctions certainly are not apparent in my specimens, and Haworth himself seems dissatisfied with them, for he adds, “As the great lepidopterist Hübner gives the water betony moth as a distinct species from that of the mullein, and figures both as above cited, it is here also enumerated, as I possess English specimens of each, and have seen others, but unless they differ more in the larva state than they do in the winged, which is almost a constant characteristic of the section (*Cucullia*), I must still conceive they are not distinct, but very slight variations only; the chief difference is the paler colour of *Scrophulariæ*, whose upper wings, especially in the broad *plaga*, are of an ochraceous colour, as figured by Hübner, while those of *Verbasci* are nearly white in the same part.” Guenée, with his usual conscientious painstaking, has endeavoured to differentiate these insects, but has not seized on the characters most insisted on by others. He says, “Les ailes superieures sont moins fortement dentées que chez *Verbasci*, proportionnellement plus large et moins aiguës au sommet. Leur couleur est plus jaune avec les parties foncées d'un brun plutôt noirâtre que ferrugineux; la côte plus cendrée; le côté terminale du triangle foncé, moins net, et n'atteignant pas la 2^{nde} inferieure; les points discoïdaux plus marqués et plus nombreux, surtout dans les femelles. Les deux traits subcostaux plus noirs et moins isolées. Les ailes inferieures sont plus clairs, avec le bordure moins fondue. L'abdomen et plus court et plus conique; la partie anterieure du poitrine seulement un peu noirâtre.” (*Noctuelites*, ii. 128.) It will be admitted, *nemine contradicente*, that Britain has produced no describing lepidopterist approaching Haworth in knowledge of species or accuracy of description, and that France has none equal to Guenée, and yet it will be seen from the preceding quotations that these most competent men, although carefully pointing out the differences between

these two species, do not perceive the same differences. The "lynx-eyed Haworth" has been unable to observe any of the differences on which Guenée insists, and Guenée, with Haworth's volume in his hand, declines to avail himself of the teaching of that eminent Englishman. My own bred specimens contumaciously ignore the differences laid down by both Englishman and Frenchman, and cannot be divided by any definitions hitherto printed. I confess myself entirely unable to separate the specimens were they mingled, and I doubt the ability of almost any other entomologist to do so. Nevertheless the larvæ of both are thoroughly well known, and differ in food, colour and even in form.

I could multiply instances to almost any extent, but I feel that there is too much of repetition already, and I have said quite enough to satisfy any truth-seeker. It may possibly be objected that by my calling the moieties of these pairs "species" I remove them from the scope of this paper,—namely, variation,—but this difficulty is very trivial: so that the subject is thoroughly ventilated, it matters little what terms we employ. Darwinianism would reduce all species to varieties, and all varieties to mere evolutions, so that precision in terms is almost hopeless, but this branch of the inquiry is open to future investigation.

The substance of this paper was read before the Entomological Society on the 2nd of February, 1857, and elicited the following observations, as reported by Mr. Shepherd, the Secretary (see Zool. 5525):—

"Mr. Stainton observed that the theory of pairs would be completely upset if the list were extended to European Lepidoptera, as there would be found in many instances continental species quite as closely allied to the pairs mentioned as these British species are to each other.

"Mr. Westwood said that he had heard, for the first time, a theory proposed capable, as was asserted, of being tested by the productions of a limited geographical range like Great Britain. He had supposed it to be generally admitted that a knowledge both of existing and extinct forms was requisite for the proposition of natural laws. Was it intended that in each country throughout the world these double species should occur? Was it only in Lepidoptera they were to be looked for? Was it intended that each species should be thus divided, as it were, into two subspecies? Moreover, in the instances cited, it was evident Mr. Newman had adduced relations of analogy,

supposing them those of affinity. No one could support such a theory. Was it intended that each species should be attended by another species intimately allied to it? No one ever doubted such a principle. In the opening part of his paper, Mr. Newman had alluded to the binary divisions of the higher groups, such as Vertebrata and Invertebrata, Ptilota and Aptera, &c.; but in the latter part he had confused these relations (vague as they often were) with the closest possible affinity that could exist in nature, exclusive, of course, of that between individuals of the same species."

Mr. Westwood's profound remarks were received by the Meeting with almost tumultuous approbation: I confess myself unable to see their exact drift, probably owing to my not being sufficiently advanced in the study of affinities and analogies.

Believe me, my dear Mr. Wollaston,

Most faithfully yours,

EDWARD NEWMAN.

PS. My next letter will, I trust, present a little more of novelty, as the subject has scarcely been considered as regards Lepidoptera. I call the letter "Eugenesic Races."

Notes on Aphides. By F. WALKER, Esq., F.L.S.

KNOWLEDGE of the Aphididæ is more difficult of attainment and requires more persevering study than that of any other tribe of insects, on account of their migratory habits and ever-varying forms, and consequent frequent appearance in new aspects. A translation of the latest systematic arrangement of them,* with references to other works on the same subject, may serve as a guide to the investigation of the family.

APHIDIDÆ, *Passerini*.

A. Antennæ seven-jointed. 1. APHIDINÆ.
AA. Antennæ six-jointed, at least in the winged form.†

* 'Gli Afidi con un prospetto dei generi ed alcune specie nuove italiane,' par Giovanni Passerini. 1860. 'Aphididæ Italicæ hucusque observatæ,' à J. Passerini, M.D. 1863.

† When the winged form of a genus is known the character of the antennæ is especially to be sought for in this form, for in some genera the apterous form has four-jointed or five-jointed antennæ and the winged form has six-jointed antennæ.—*Passerini*.