

hörigkeit zu der behandelten Gruppe nicht klar geworden bin. Eine zweite große Gruppe bildet *L. serpa* Raf. mit ihren Verwandten *L. littoralis* Wern., *jonica* Lehrs, *taurica* Pall., an die sich *L. peloponnesiaca* Bibr. Bory anschließt; eine dritte die westlichen Eidechsen (*L. hispanica* Stdchr. mit *balearica*, *pityusensis*, *lilfordi*, *dugesii* M. Edw., *atlantica* Ptrs. & Doria, *galloti* D.B. und *simonyi* Stdchr.); eine vierte, die Gruppe der *L. agilis* L. mit *L. parva* Blng., *viridis* Laur., *ocellata* Daud.). Eine kleinere Gruppe bildet die von der *L. muralis* sich abzweigende *pratricula* Eversm., *L. vivipara* Jacq. (und *derjugini* Nik.); *L. jayakari* Blng., *princeps* Blanf., ja sogar die mir wohlbekannte *L. genei* Cara vermag ich einstweilen noch nicht in bezug auf ihre Verwandtschaft zu beurteilen.

### 11. The Orders of Insects.

By A. E. Shipley, Fellow and Tutor of Christ's College, Cambridge and University Lecturer in the Advanced Morphology of the Invertebrata.

eingeg. 28. Nov. 1903.

There is now a fairly common agreement amongst Zoologists to divide the group Insecta into twenty-one or twenty-two orders. Dr. D. Sharp in his Paper read in 1898 at the Cambridge Meeting of the International Congress of Zoology, enumerated these orders as follows:

Apterygota	{	Collembola.
	{	Thysanura.
Anapterygota	{	Mallophaga.
	{	Anoplura.
	{	Siphonaptera.
Exopterygota	{	Orthoptera.
	{	Perlidae.
	{	Psocidae.
	{	Termitidae.
	{	Embiidae.
	{	Ephemeridae.
	{	Odonata.
	{	Thysanoptera.
	{	Hemiptera.

Endopterygota	{	Neuroptera s. str.
		= <i>Planipennia</i> includes <i>Panorpatae</i> <sup>1</sup> .
		Trichoptera.
		Lepidoptera.
		Colcoptera.
		Strepsiptera.
		Diptera.
		Hymenoptera.

To some of the names in this classification certain objections are evident. The use of the family names Perlidae, Psocidae, Termitidae, Embiidae, Ephemeridae, as ordinal names is to be deprecated.

On the other hand a common termination such as “-ptera”, which already exists in many of the larger groups, should be extended if possible throughout the entire Class. I therefore venture to put forward certain new names, all of which have a common ending and therefore would simplify the terminology of the Orders which are now so numerous. I propose 1) that we confine the word **Aptera** to the Thysanura, 2) that we call the Collembola **Apontoptera**, from the Greek *ἀποντ*—(absent); 3) that we call Mallophaga **Lipoptera**, from the Greek *λιπ*—(*λείπω*); 4) that we call the Anoplura (Pediculidae) **Ellipoptera**, from the Greek *ἐλλιπ*—(*ἐλλείπω*), 5) that we resume the term **Aphaniptera** for the Siphonaptera; 6) that we retain the name **Plecoptera**, used by Brauer, for the family Perlidae; 7) that we call the Psocidae **Psocoptera**; 8) that we call the Termitidae **Isoptera**; 9) that we call the Embiidae **Embioptera**; 10) that we call the Ephemeridae **Ephemeroptera**; 11) that we adopt the name **Paraneuroptera** for the Odonata; 12) and that we retain Packard's name **Mecaptera** for the Panorpatae.

These new names obviate the difficulty of calling what are now recognized as Orders by family names, and, if adopted, would give an uniform termination to all the twenty-two Orders which are now recognized in the Class Insecta.

In drawing up these new names I have taken advantage of the advice of Dr. D. Sharp and Mr. F. J. H. Jenkinson, University Librarian here, so that I trust they will meet the requirements of Science without offending classical scholarship.

Accepting these new names the names of the Orders of the class Insecta will be as follows:

<sup>1</sup> Sharp, l. c., did not admit the Panorpatae to be certainly distinct from Neuroptera. I have however given them a distinct place in the list of Orders hereafter set out, because they are considered distinct by some taxonomists and are already provided with a suitable name.

## Classification of Insects.

	Name suggested.	Old name.
Apterygota	1. Aptera . . . . .	Thysanura.
	2. Apontoptera, new name. . . . .	Collembola.
Anapterygota	3. Lipoptera, new name . . . . .	Mallophaga.
	4. Elliptoptera, new name . . . . .	Anoplura.
	5. Aphaniptera . . . . .	Siphonaptera.
Exopterygota	6. Orthoptera . . . . .	Orthoptera.
	7. Plecoptera . . . . .	Perlidae.
	8. Psocoptera, new name . . . . .	Psocidae.
	9. Isoptera <sup>2</sup> . . . . .	Termitidae.
	10. Embioptera, new name. . . . .	Embiidae.
	11. Ephemeroptera, new name . . . . .	Ephemeridae.
	12. Paraneuroptera, new name . . . . .	Odonata.
	13. Thysanoptera . . . . .	Thysanoptera.
	14. Hemiptera . . . . .	Hemiptera.
Endopterygota	15. Neuroptera . . . . .	Neuroptera.
	16. Mecaptera . . . . .	Panorpatae.
	17. Trichoptera. . . . .	Trichoptera.
	18. Lepidoptera . . . . .	Lepidoptera.
	19. Coleoptera . . . . .	Coleoptera.
	20. Strepsiptera . . . . .	Strepsiptera.
	21. Diptera . . . . .	Diptera.
	22. Hymenoptera . . . . .	Hymenoptera.

With regard to the classification of these Orders I may remark that the group Endopterygota comprises all the holometabolous Orders; and the Exopterygota all the hemimetabolous Orders. These two categories are therefore in a certain sense natural and may be adopted. But with regard to the Apterygota and the Anapterygota of Sharp this is not the case. The Aphaniptera are — so far as the evidence at present goes — holometabolous and are unique inasmuch as they combine the absence of wings with a complete metamorphosis. At the same time it will be remembered that in most, if not all, of the endopterygotic

<sup>2</sup> In a recent Paper (Zool. Anz. Bd. 26. 1903. p. 423) Dr. Enderlein suggests the splitting up of the group Corrodentia of Brauer into three sub-orders 1) the Isoptera which according to him includes both the Termitidae and the Embiidae. Following Dr. Sharp's classification I have suggested that the Isoptera be confined to the Termitidae and have proposed the new name Embioptera for the Embiidae, 2) Dr. Enderlein's second sub-order the Copeognatha includes the Psocidae which in accordance with the wish to change as little as possible and to make all Insect Orders end in "ptera" I have called Psocoptera, 3) his third sub-order is Mallophaga for which I propose the name Lipoptera.

and exopterygotic Orders there occur forms that are wingless, e. g., the females of many Lampyridae, in which there coexist the absence of wings and diminution of the change of form in the successive instars that make up the Ontogeny.

The Mallophaga and Anoplura again are purely parasitic forms and thus differ entirely from the Apterata and Apontoptera. Although the Apterata and Apontoptera have been associated by Packard as Synapterata it is still very doubtful whether there is any real affinity between these two Orders.

These considerations render it evident that we are not yet in a position to finally classify the wingless Orders of Insects.

Those who wish to do so may however adopt temporarily three divisions for them viz., 1) Synapterata, for Apterata and Apontoptera, 2) Parasitica, for Mallophaga and Anoplura, 3) Anapterygota, for Siphonapterata.

In reference to the construction of the new names here proposed it is perhaps right to point out that as it has been thought desirable to apply the termination -"ptera" to all the Orders for the sake of a uniform terminology, it is clear that in the case of the wingless Orders this termination can only be correctly used by combining it with some term signifying "destitute of". Hence the names I propose to apply to the wingless Orders indicate in each case the absence of wings.

The Zoological Laboratory, Cambridge, November 1903.

## 12. On the presence of mobile fat in the Chromatophores of the Crustacea (*Hippolyte* varians).

By Frederick Keeble, University College Reading, and F. W. Gamble, Owens College Manchester.

eingeg. 1. Dezember 1903.

The present paper is an abstract of our researches into the distribution and movements of fat in the prawn *Hippolyte*.

The researches have been carried on at Trégastel (Brittany), at Naples, and in the laboratories of Owens College Manchester, and of University College, Reading.

1) Distribution of Fat. *Hippolyte* offers a remarkable contrast to crabs, lobsters, and cray-fish with respect to the distribution of its fat. In these latter, according to Dastre (1901), storage-fat is confined to the liver: in *Hippolyte* we find that it occurs not only in liver, but also in the chromatophores and epidermal cells. As means of identification, we use 1) the optical characters of the granules, 2) the osmic acid reaction, 3) that of Sudan 3. and Scharlachrot (Michaelis methods).