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From the Author 16

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AN

ADDRESS

READ AT THE

ANNIVERSARY MEETING

OF THE

ENTOMOLOGICAL SOCIETY OF LONDON,

ON THE

22nd JANUARY, 1872.

BY

ALFRED R. WALLACE, F.L.S., F.Z.S., &c.,

President.

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THE PRESIDENT'S ADDRESS.

GENTLEMEN,

When I had the honour of addressing you a year ago, it was my duty to record the heavy loss we had sustained by the death of two of our members, both Entomologists of the first rank, and one of them of European reputation. I am now happy to be enabled to inform you that, during the year 1871, our Society has suffered no losses by death, either among its home or foreign members, neither have we to regret the loss to our science of any Entomologist of especial eminence. Yet the obituary portion of my address will by no means be a blank, since we have lost in the past year four entomological authors of some note, while two others died in the latter part of 1870, but were not noticed in my last address.

Rudolf Felder, Doctor of Laws, only son of Dr. Felder, Mayor of Vienna, died on the 29th of March, 1871, at the early age of twenty-eight years. He devoted most of his leisure to the study of his father's extensive collection of Lepidoptera, and to the publication, in conjunction with his father, of a variety of valuable descriptive and classificational papers. Their greatest joint work is that on the Lepidoptera of the 'Novara' Voyage, which contains descriptions of nearly a thousand butterflies, the largest portion of which are illustrated by figures, which are well drawn, beautifully engraved, and admirably coloured. The descriptions, which are all in Latin, are understood to be by Rudolf Felder, who seems to have had a talent for discerning specific differences as well as those more important structural characters on which natural genera are founded, and the power to express them in terse and well-chosen language. By publishing so large a number of excellent coloured

figures of new butterflies and moths, the two Felders have conferred a benefit upon Entomology which will not soon be forgotten; and, in the early death of the younger, we have lost one of our most earnest and most enlightened students of the fascinating but difficult order of Lepidoptera.

Victor von Motschulsky died at Simferopol on June 5th, 1871. He was a colonel on the staff of the Russian army, and made very extensive journeys in an official capacity to the remotest parts of the vast Russian Empire, as well as to other countries. His first important work, published more than twenty years ago in the Transactions of the Imperial Academy of Sciences of St. Petersburgh, was on the Coleoptera of Siberia, describing hosts of new species of Geodephaga, with exact localities. He afterwards published a large work entitled 'Die Käfer Russlands.' His 'Etudes Entomologiques' formed a miscellaneous record of his travels and adventures in the Caucasus, Central and North America, and other countries, and contained descriptions of great numbers of new species. He also described and catalogued the Coleoptera collected by various travellers in the Amur and in Central Asia, and published several memoirs on the Coleoptera of California. Of late years he wrote chiefly in the well-known Moscow 'Bulletin,' monographing various groups of Coleoptera and describing large numbers of new genera and species. I am informed by Mr. Bates (to whom I am indebted for most of the foregoing information) that Motschulsky has a reputation for carelessness and inaccuracy, for recklessness in introducing new classifications, and for ignoring the works of his predecessors. His genera and other new groups are often unintelligible; and it is therefore not improbable that his great labours as an author have been on the whole of more injury than benefit to the science to which he devoted himself. Although almost exclusively a Coleopterist, he also described many Lepidoptera.

Professor J. T. C. Ratzeburg died at Berlin on the 24th of October last, in his seventy-first year. He occupied himself especially with the metamorphoses and the ravages of insects injurious to forests, and his great work 'Die Forstinsekten' is a lasting proof of his industry and keen powers of observation. He also published a popular edition of this work, as well as the portion relating to the parasitic Hymenoptera (which play so important a part in checking the ravages of forest insects), in a

separate form. He was also a constant contributor to German entomological periodicals. He was one of the few Entomologists who devote themselves, almost exclusively, to a study of the habits and economy of known insects rather than to the description of new ones; and will always be remembered by the Coleopterist for his elaborate researches into the Natural History of the Xylophagous beetles.

On the 18th of December last, Von Heinemann of Brunswick died suddenly. His work on German and Swiss Lepidoptera is well known, and he was engaged in correcting the proofs of the concluding portion at the time of his decease.

Dr. J. P. Rambur died at Geneva on the 10th of August, 1870, aged 69. When a young man he explored the Entomology of Corsica and Andalusia, and in 1842 commenced publishing an expensive Entomological Fauna of the latter country, but the issue was soon discontinued. In the same year appeared his chief work, the volume on Neuroptera, in the 'Nouvelles Suites à Buffon." He tells us in his preface to this work that the Lepidoptera were his favourite study, while the Neuroptera were, of all insects, the least attractive to him; yet the task so inauspiciously undertaken was executed in a manner which proves him to have been a true Entomologist. He paid great attention to structural details, and especially to secondary sexual characters, which have since been found so valuable in the classification of other orders of insects. He laid the foundations of the modern classification of the Neuroptera, and, in so doing, made a real advance in the study of Entomology. He was one of the founders of the Entomological Society of France.

Dr. Emeric von Frivaldszky of Pesth, a Hungarian Entomologist and traveller, died during the year 1870, aged 72. He was more especially known by his investigations of the Entomological fauna of the Balkan Mountains, and of Asia Minor. He published several memoirs on the results of his expeditions, but many of these are in the Magyar language, and remain as sealed books to most Entomologists. Latterly he industriously investigated the cave-beetles of his native country.

The Entomological literature of the year possesses many features of interest, and I propose to notice a few of the more remarkable works I have met with; after which I shall beg to

offer you some more detailed observations on two special subjects which are suggested by them.

Giving the precedence to our own "Transactions," I am happy to say that the yearly volume just completed contains papers of great originality and value, so as fully to maintain its reputation as a standard scientific work. The first and most important paper is the careful and elaborate monograph of the Ephemeridæ, by the Rev. A. E. Eaton; beautifully illustrated by six plates, crowded with details of the structure of the various species. All the known species of the family, 178 in number, are fully described, and immense research has been bestowed upon the literature and synonymy.

Three papers, by Messrs. Hewitson and Butler, describe new species of butterflies, while Professor Westwood, Messrs. Bates, Baly, Sharp, Wollaston, and C. O. Waterhouse, describe new Coleoptera. Mr. Albert Müller discusses the dispersal of non-migratory insects by atmospheric agencies, and adduces evidence to show that this is constantly going on, and is one of the regular means by which the existing geographical distribution of insects has been brought about.

Our honorary member, the Baron de Selys-Longchamps, has given us, in a short paper, a summary of the group of dragon-flies as at present known; from which it appears that there are 190 genera and 1357 species, including some in our collections which are not yet described.

Mr. B. T. Lowne has contributed a curious and suggestive paper on "Immature Sexuality and Alternate Generation in Insects," in which he discusses the phenomena of apterous females and largely developed horns and other appendages in the males, as directly due to sex. He doubts the action of sexual selection in producing the horns and other ornaments of beetles, and maintains that the apterous and larval forms of the existing higher insects are all acquired, and not due to descent from ancestral larval forms.

Mr. W. Arnold Lewis has given us a very important critical paper on the arrangement of Lepidoptera, and on the use and abuse of synonymic lists and other catalogues. Not only do his criticisms appear to me to be, for the most part, sound and of great value, but he has treated one of the dryest and most uninviting of subjects with so much skill and such command of

language, as to make it not only intelligible and interesting, but even amusing. His views on nomenclature have caused some discussion, and they have an important bearing on a subject I shall refer to presently. The remaining papers are—"On the forms of *Zygæna Trifolii*," by Mr. Briggs, in which the question of species and variety is discussed; and one by Mr. McLachlan on the identification of three species of Myrmeleon described by Linnæus.

The Proceedings of the Zoological Society of London, published during the past year, contain few Entomological papers. Part iii. of the volume for 1870 (which appeared in 1871) contains a list of a collection of North Indian butterflies by Mr. Butler, a note on abnormal neuration in an Acræa by the same author, and two papers on spiders by Mr. O. Pickard Cambridge. The two parts already published for 1871 contain another paper on spiders by the last-named gentleman, and four papers on butterflies by Mr. Butler, as well as one by Mr. W. S. Atkinson on the same group. The Journal of the Linnean Society contains several Entomological papers:—on new forms of Ascalaphidæ and on the classification of the Ascalaphidæ, by Mr. M'Lachlan; Contributions to a Knowledge of Curculionidæ, pt. ii., by Mr. Pascoe; a Note on Mr. Murray's Coleopterous Faunæ, by Mr. Trimen; a Catalogue of Aculeate Hymenoptera and Ichneumonidæ of India and the Eastern Islands, by Mr. F. Smith, with some introductory observations by myself; Observations on a Light-giving Coleopterous Larva, by Dr. Hermann Burmeister; and Sir John Lubbock's paper on the Origin of Insects. The 'Annals and Magazine of Natural History' contains no less than ten papers on insects in the last year's volumes, of which the following is a list:—On Insects inhabiting Salt Water, by Dr. Packard; Descriptions of new Butterflies, and of a new Paphia, by Mr. O. Salvin; List of Coleoptera from Old Calabar, by Mr. A. Murray; New Species of Lepidoptera, by Mr. Butler; Life in the Wyandotte Cave, in which several cave-insects are described, by Professor Cope; Catalogue of Zygopinæ, Additions to Australian Curculionidæ, New Genera and Species of Longicorns, and Notes on Coleoptera, by Mr. Pascoe; Spiders of Montreal, Upper Canada, by Mr. John Blackwall; and Coleoptera of St. Helena, by Mr. T. Vernon Wollaston. The 'Zoologist' contains Notes on Chalcididæ, by Mr. Francis Walker. The 'Entomologists'

Monthly Magazine' has contained, during the past year, the usual quantity of valuable and interesting matter on every branch and aspect of British Entomology, and has also contained a number of papers of wider interest, treating of classification, or describing new species of insects. Among the contributors of this class are Messrs. Stainton, Butler, Ward, and Scudder, on Lepidoptera; Messrs. Sharp, Bates, Waterhouse, and Reed, on Coleoptera; and Mr. M'Lachlan, on Neuroptera and Trichoptera.

Mr. Hewitson's beautiful illustrations of butterflies have regularly appeared throughout the last two years, and fully maintain their high reputation for delicacy of execution and superb colouring. Long may he live to continue them! till they form a monument of his patient skill and enthusiastic love of nature, unequalled by the work of a single individual in any age or country. Our stores of Lepidoptera have, however, been of late so rapidly increasing that no pencil can keep pace with the supply, and we have all to thank Mr. Butler for helping on the good and useful work of accurately delineating the new and puzzling forms that crowd upon us. In his 'Lepidoptera Exotica' he has boldly essayed a new style of art in this country, that of illustrating species by colour-printing. Ten quarterly parts have now appeared, in which a large number of new butterflies and moths are, always accurately and often beautifully, delineated. As specimens of art these will not, of course, compete with the best hand-work, but as representations of Nature they are all that can be desired; and some of the last issued plates are so beautiful, and so well represent the texture of the lepidopterous wing, that they may be preferred by some to the superior brilliancy of hand-colouring. It must be remembered that the expense of such a publication (where the demand for copies is limited) is very great, and in such a case there can be little or no advantage over the old method in point of cost; but the experience in this mode of work now being gained, will, it is to be hoped, lead to its being applied to publications where a large number of copies are required, and where the saving of expense will be a real boon to many a working naturalist. Before dismissing Mr. Butler's meritorious work, I would, however, protest, both on the score of utility and of harmonious effect, against the introduction of brilliant flowers among the figures of butterflies, This has been tried in one plate, which I trust will be the last of its kind.

As an example of the importance Entomology may assume in a new and partially cultivated country, I may call your attention to a Report on the Noxious and Beneficial Insects of the State of Missouri, made to the Missouri Board of Agriculture by the State Entomologist, Mr. Charles V. Riley, a gentleman of English birth and education, who, you will recollect, attended one of our meetings during the past year. In this Report, containing the matter of a fair-sized volume, we have popular and lively, yet accurate descriptions of a large number of noxious insects, with full accounts of their transformations and general economy, and of the various methods of guarding against their ravages. The vine in America seems especially liable to attack, the ravages of an Aphis, three Coleoptera and seven Lepidoptera being here described, while this is only a third of the series of articles (not yet concluded) on insects injurious to the vine. This superabundance of enemies is due, no doubt, to the fact that numerous species of grape, and of several allied genera of plants, are indigenous to the United States, and there are thus a host of insects ready to seize upon the more luxuriant and juicy cultivated vines. In the latter part of the Report, under the heading 'Innoxious Insects,' we have a most excellent account of two common American butterflies, the *Danais Archippus*, Fabr., and the *Limenitis disippus*, Godt., in which the subject of mimicry, as illustrated by these two species, is very clearly treated. Mr. Riley's own experiments on the Archippus butterfly adds something to our knowledge of this interesting subject. He found that neither turkeys, chickens, toads, nor snakes, would touch the brilliantly-coloured larva, and he observed that these larvæ have a pungent and nauseous odour, especially perceptible when a few are confined in a box. In the imago state the odour is even stronger. The larva is not wholly free from enemies, for though hymenopterous parasites have never been observed to attack it yet it is often killed by the dipterous *Tachina*. The caterpillar of the Limenitis, on the other hand, is attacked by, at least, three parasites, two hymenopterous and one dipterous. Other facts of importance are, that the larvæ of the *Limenitis disippus* are protected by their colours, closely resembling the various willow-leaves on which they feed, while the pupæ resemble birds' dung, more especially for the first few hours after their transformation; and that Mr. Otto Lugger, a gentleman employed on the U. S. Lake

Survey, once saw a bird dart after an Archippus butterfly, seize it, and immediately drop it, uneaten. Mr. Lugger picked up the butterfly, and was much puzzled at the time to account for this singular action of the bird.

A characteristic feature of the past year is the number of valuable catalogues, lists, and monographs that have appeared. Our own Society has issued, as a second instalment of the 'Catalogue of British Insects,' a Catalogue of the Aculeate Hymenoptera, by Mr. Frederick Smith. Mr. Edward Saunders has given us a compact and useful catalogue of all the described species of the extensive and beautiful family of Buprestidæ, and has furnished it with an excellent index.

The Vicomte de Bonvouloir has published the first part of his long-expected Monograph of the Eucnemidæ, in which he has given careful descriptions of the species in this difficult family, accompanied by exquisitely-engraved figures of nearly half of them. A few years ago Lacordaire enumerated only 70 described species: the present Monograph contains 450.

Dr. Thorell, one of the Professors of Zoology in the University of Upsala, is publishing an elaborate critical work on European spiders. The book is written in English, and the first part, which appeared in 1870, contains some observations on Zoological nomenclature, to which subject the author has devoted much attention. He refers to the old British Association rules with general approval, but differs from them on some important points. He holds the law of priority as absolute, under a few definite restrictions. 1. There must be definition or description, and publication. A recognizable figure of a species he considers sufficient, but of a genus there must be a description pointing out the generic characters. He says, "A new genus that has been distinguished merely by referring to some particular species of an older genus as its type, without in any way indicating which of the characteristics of the species is to be considered as the mark of the new genus, no one can indeed be looked upon as bounden to acknowledge." He adds, "Nevertheless it appears to me advisable to do so, especially if the species referred to deviate in any generally known manner from the typical species of the old genus, and always if the new genus has been once received and acknowledged." 2. As to how far back the application of the law of

priority should extend, he has some very important observations. The binomial system of nomenclature was, he says, fully and distinctly propounded by Linnæus in the 'Philosophia Botanica,' published in 1751, and there can be no reason whatever why authors who adopted and systematically applied it should be set aside, because Linnæus himself did not apply it to the whole animal and vegetable kingdoms till 1758. An example occurs in Dr. Thorell's group, Clerck having in 1757 applied it with perfect consistency in his 'Aranea Suecici.' His law therefore is enunciated as follows:—"that in determining the priority of a specific name notice should be taken only of those works in which the Linnæan binomial nomenclature is exclusively and consistently employed." This rule has the great advantage of being independent of date; it goes to the root of the matter and would have some very important results in the determination of synonymy, and I cannot but regret that it was not adopted in the amended British Association rules, instead of the illogical compromise of the 12th Ed. of the 'Systema Naturæ,' with exception as regards two authors, Artedi and Scopoli. An important complement of this simple rule is, that all writings published subsequently to that epoch in which that nomenclature has not at all or not consistently been employed, count for nothing. The same date, our author thinks, should apply to generic as to specific names, both being characteristic of the binomial nomenclature, and it being impossible, if we go back earlier, to determine what are to be considered as truly generic names."

3. Dr. Thorell would not prohibit the employment of the same generic name in Zoology and Botany, such a restriction being unnecessary, and leading to wholesale alteration and consequent confusion.

4. He is a strict purist, and alters the termination of every name he considers to be not classically constructed. He admits that there is often difference of opinion on these points, but does not seem to consider that the consequent confusion and instability of nomenclature is as great an evil as classical inaccuracy.

Our author agrees with most zoologists in rejecting the plan used by botanists, of giving as authority for a species the man who placed it in the last new genus, remarking that he is "unable to discover what advantages that custom can offer." He

well observes that it conceals the epoch when a species was first made known, and it also prevents us from going direct to the work where we shall find the species first described.

The body of Dr. Thorell's work is devoted to a thorough examination of the literature and classification of European spiders, with especial reference to two important Monographs, the authors of which were each unacquainted with the other's works. These are, Westring's 'Aranei Suecicæ,' and Blackwall's 'British Spiders,' which, although largely treating of the same insects differ widely in their nomenclature. Both works were published about the same time, and they exhibit a remarkable coincidence in the number of species inhabiting the two countries, Sweden having 308, Great Britain and Ireland 304. A considerable number of southern forms occur with us which are wanting in Sweden, the latter country of course possessing a corresponding proportion of northern and continental forms which we have not. The portion of the work already published is devoted to a critical examination of the genera, both as regards synonymy, classification and structural characters; the species will, I suppose, be afterwards treated in a similar manner.

Of a less extensive scope is Dr. Hagen's 'Monograph of the fresh water Astacidæ of North America,' which, besides going into interesting anatomical details, brings out a curious fact in geographical distribution, analogous to what occurs in some groups of insects. These crawfishes consist of two well-marked genera, Cambarus and Astacus. Cambarus contains 32 species, and is entirely confined to North America, east of the Rocky Mountains. Astacus, on the other hand, is confined to the Pacific coast of America, but also extends into Europe and Asia.

Another work, which may be considered a new one, is Staudinger and Wocke's new edition of their Catalogue of European Lepidoptera, which is now extended to include all the species of the Europæo-Asiatic Fauna. The limits defined are nearly, but not quite, the same as those of Dr. Sclater's Palæarctic region. They extend from Iceland to the mouth of the Amur river, going only as far south as 45° or 50° latitude in the east, while in the west of Asia there is an extension as far as 30° in South Persia. The south-east of Persia, towards Affghanistan, is said to show a transition towards the Indian Fauna. Syria and Palestine are wholly European, while Arabia and Egypt should probably be

excluded. All the rest of North Africa, Madeira and the Canaries are considered as forming part of Europe, while the Cape de Verdes are African. The polar regions are said to be wholly European as far as South Labrador and Canada, where North American forms begin to prevail. A very good feature in this catalogue is the separation of accidental variations from true local varieties or races. The former are called "aberrations," the latter only "varieties." Those forms which some naturalists class as varieties, while others consider them to be good species, are termed "Darwinian species." Of all these kinds of varieties a brief Latin diagnosis is given. The number of species in this extended catalogue is 6062; and in the index each genus, species, synonym, and variety, is entered, and severally distinguished by differences of type.

In the preface Dr. Staudinger gives his views as to rules of nomenclature at some length, and it will be of interest to compare them with those of Dr. Thorell, and with our own. His rules are as follows:—

1. Species should be designated by a double Latin name, as first adopted by Linnæus in the 10th edition of the 'Systema Naturæ.'

On the question of taking the 12th edition, instead of the 10th, as the starting-point for specific names, he epigrammatically remarks: "This way of acting is illogical, and endangers the stability of specific nomenclature; it is illogical because it does not begin at the beginning; it is dangerous because it starts with an exception, and a denial of justice."

2. The names of species should be in Latin or latinized.

Staudinger objects to such names as *Amphionycha knownothing*, and claims the right to latinise them, retaining the original name for purposes of reference. At this one ground of alteration, however, he takes his stand, and will admit of no other whatever. He says, that if specific names are altered on philological grounds, they may be equally altered for errors in botany, geography, &c., and all stability will be at an end. As an extreme case he cites the following corrections of a supposed erroneous name. *Agrotis nictymera*, Boisd., was altered by Herrich-Schäffer into *Nychtemera*, by Duponchel into *Nyctymera*, by Guenée into *Nyctimera*, by Zeller into *Nychthemera*, and by Speyer into *Nyctimena*. He would consider every specific name, once given

and duly latinized in termination, as a *proper name*, write it with a *capital letter*, and treat it as *unalterable*. His collaborateur Wocke, however, does not agree with him, and therefore he does not fully carry out his views in this catalogue.

3. The first describer of a species should have his name attached to it, even though it be removed to another genus.

He protests, like Dr. Thorell, against the practice of botanists and of many American zoologists in this respect.

4. Museum and catalogue names, without any recognizable descriptions, are void.

5. Every species should absolutely preserve the name under which it has been first described, in accordance with the Linnæan nomenclature.

6. The same specific name may be employed in genera sufficiently remote from each other.

7. A description founded on two or more species can only in exceptional cases be applied to either of them.

8. Species described from the larvæ or pupæ only can not be retained should the perfect insect differ much from known species.

Gemminger and Harold, whose great Catalogue of Coleoptera has been suspended owing to the Franco-Prussian war, but will it is hoped shortly be resumed, carry out the law of priority with great rigour; adopting the oldest name, however bad the description may be, and although the identification is only possible by reference to the type specimen. But they do not admit the validity of any descriptions in fugitive papers or price catalogues. They are purists in orthography, taking exactly the opposite view to the German Lepidopterist cataloguers, and unmercifully alter all names which they conceive to exhibit unclassical construction or erroneous orthography.

One of the most important, if not the most important, of the entomological works of the year 1871 is, undoubtedly, Mr. W. F. Kirby's 'Synonymic Catalogue of Diurnal Lepidoptera;' a volume of 690 pages on the general plan of Gemminger and Harold's 'Catalogue of Coleoptera.' It is issued as a complete work, containing all, or very nearly all, the species and varieties of butterflies described down to the date of publication, with very full synonymy accompanied by dates, and with a column of localities. There is no enumeration of the species either in the

genera or families, and this is an omission; but an estimate by counting a number of pages taken at random gives between nine and ten thousand as the number of species and varieties; and the full and excellent index has about twelve thousand separate references, and appears to contain every generic and specific name, and almost every synonym and variety mentioned in the volume. That such a laborious work, and one of such great use to entomologists, should have been undertaken by so young a man as Mr. Kirby, and successfully completed in so short a time and under the disadvantage of residence in Dublin, where no extensive collections or complete entomological libraries exist, excites our admiration and respect, and proves the author to be not unworthy of the honoured name he bears.

In so extensive a work errors are unavoidable, and the fact that they are discovered and pointed out can hardly be said to detract materially from its merits or its value, if the author does all in his power to circulate among his readers lists of such errata. Every one will then have it in his power to make the needful corrections, each in its proper place, and the work may thus be soon rendered perfect as a book of reference. Leaving such inevitable errors to be discovered by those who use the work, I propose to make a few remarks on some more general topics suggested by this catalogue and by the other works of the like nature to which I have referred.

I would first note the omission of any statement in the preface of what systematic arrangement has been followed. It appears to differ in many points from all previous arrangements, and Mr. Kirby thus lays himself open to the very just criticism of Mr. Lewis, that a catalogue is not the right place to introduce a new classification, still less to introduce it without note or comment, reason or explanation.

The most novel, and, as many will think, the worst feature of the book, is the entire revision of the generic nomenclature (not of the synonymy merely, as stated in the preface), in accordance with a series of rules selected from those issued by the British Association and published in their Report for 1865. This revision has the effect of abolishing scores of old and familiar names, and replacing them by others altogether new to the majority of Lepidopterists. This is done, either because the name is supposed to be preoccupied in some other branch of

Natural History, or because an earlier generic name than that in common use has been discovered. Now although these are valid reasons for altering a name in some cases, they are not always so, and I think we should refuse to accept the decisions of any author who is not governed by the limitations which the British Association Rules place on the alteration of names. It is even questionable whether the author of a catalogue is not going beyond his province in making any corrections or alterations of names in use, for any reason whatever. It may be said that he should simply record the facts, adopt the nomenclature in use, whenever there is uniformity among living authors, and point out if he likes in foot-notes his belief that such a name should be altered for certain reasons. He should consider himself an adviser in such matters, not a judge. I will take one example, almost the first that struck me on turning over the pages of Mr. Kirby's Catalogue, in order to show the mischief of such alterations, and how little they help to promote stability of nomenclature. We find, at p. 303, the old genus Erycina of Fabricius, which for sixty years has stood without a synonym, and which is familiar to every one acquainted with South-American butterflies or with the illustrations of Hewitson, Saunders, and Felder, entirely abolished in favour of a much later name, Ancyluris, because the original name is said to be preoccupied. Yet, according to the British Association Rules, the name Erycina must stand; Rule 10, which applies to this case being as follows: "A name should be changed which has before been proposed for some other genus in zoology or botany, or for some other species in the same genus, *when still retained for such genus or species.*" The last clause of this rule saves our old and admired friend Erycina from the indignity of an *alias*, for although that name was given to a genus of Mollusca by Lamarck in 1805, it has long been abolished as an unintelligible "omnium gatherum," and the species distributed in various Linnæan and other genera. Mr. Kirby, however, prints the rule in his preface, omitting the last clause, and by doing so has been led to make alterations which those rules in their entirety do not justify, and which therefore cannot stand.* But by far the most

* Even should it be necessary to alter a name on account of preoccupation, the change made should be as small as possible, and should be effected by altering a single letter or the termination—not by the introduction of a totally new name, such as is usually given by Mr. Kirby. Thus if Paphia, *Fabr.*, which has been in

important and most numerous alterations are caused by adopting the names of an author who has long been purposely ignored as an authority for genera, both by English and Continental Lepidopterists; I of course allude to Hübner. Such old names as Chionobas, Agraulis, Eresia, Godartia, Adolias, Polyommatus, Leptalis, Terias, Callidryas, Thestias, and Anthocharis, with many more, are changed for others which most of us have never heard of, and which are generally to be found in no other work than Hübner's obsolete and useless catalogue. Yet this wholesale change does not seem to be warranted by the Rules of the British Association, which indeed Mr. Kirby in his work altogether ignores. Rule 12 says: "A name which has never been clearly defined in some published work should be changed for the earliest name by which the object shall have been so defined." And in the explanatory remarks it is said, "Definition properly implies a distinct exposition of essential characters, and *in all cases we conceive this to be indispensable*." Now this rule merely embodied the feeling and the practice of naturalists, and it had been acted on for nearly thirty years before it had been formally enunciated, in this very case of Hübner, whose work had been systematically set aside as an authority by most European entomologists because it was felt that his so-called genera were mere guesses founded on *faciés* alone,—happy guesses no doubt sometimes,—but as frequently wrong as right, and wholly without such *definition* as was held, even in his own day, to be required to constitute a new genus. Boisduval expressly states this, at p. 153 of his 'Species General des Lepidoptères,' and his non-recognition of Hübner's genera has been followed in almost all the great systematic works which have since been published. If we take Hübner's first four genera, and the characters he gives for them, we shall be able to judge of the reasons for this course.

They are as follows:

Hymenitis . .	Upper wings half-banded.
Ithomia . . .	Upper wings one banded.

uninterrupted and exclusive use for sixty-four years, is really preoccupied, it would be much better to alter it to Paphius, and still quote Fabricius as the authority, than change it to so totally dissimilar a name as Anæa of Hübner. A more recent example is Idiomorphus, which might have been similarly modified and retained instead of being changed to Bicyclus, *Kirby*. No law requires this total change, while every consideration of convenience no less than of justice is better satisfied by a slight modification.

Oleria . . . Upper wings twice banded.
Thyridia . . . Both wings banded.

Such a mode of defining genera, although it has the merit of being simple and symmetrical, is undoubtedly superficial; and it can only be by the purest accident that a group so characterised can correspond in extent to any real genus. It is therefore not surprising that two of these four Hübnerian groups of species do not constitute modern genera; yet, because one of the rejected names, Oleria, has been applied by Mr. Bates to an allied genus characterised by him, Mr. Kirby thinks it necessary to give it a new name, because it does not correspond to the Oleria of Hübner, again breaking the British Association law. In Mr. Kirby's own work, we find Hübner's condemnation in almost every page, in the utter want of agreement between his groups and modern genera. The modern restricted genus Heliconius, for instance, contains species belonging to seven Hübnerian genera; Pieris comprises five, and Thecla twelve of these hap-hazard groups; while, in other cases, the species comprising Hübner's groups are divided among several quite unrelated modern genera.

Now here, it seems to me, the case is very strong against the practice of those who, like Mr. Kirby, advocate the adoption of Hübner's generic names. It is not that those who hold opposite views seek to annul or over-ride the law of priority by any self-created law, or by individual opinion; but it is a case in which there has been hitherto almost a universal agreement, fully supported by the tenor of the British Association Rules, that the names sought to be reinstated rank as mere catalogue names for want of proper definition, and should, therefore, never be quoted. The idea of justice to the first namer or describer of a species is sometimes appealed to; but the law of priority is founded on no such expressed idea, but rather on the universal practice of mankind, which always upholds stability of nomenclature, and requires cogent reasons of convenience or beauty to sanction an alteration. Intelligible language is wholly founded on stability of nomenclature, and we should soon cease to be able to understand each other's speech, if the practice of altering all names we thought we could improve upon, became general. It was because this practice of reckless alteration of names had become so prevalent among naturalists, that it was found necessary to declare that

names once given and published were thenceforth unchangeable. It is rather unfortunate that the laws which govern the formation of languages in general were not more consulted, for it would then have been seen that the proper rule to adopt would have been unchangeability of names in use, rather than priority of date, which latter rule ought only to have been brought in, to decide on the claims of two or more names in use, not to revive obsolete names never in use or long ago rejected. Yet even as a matter of justice, it may be maintained that we should recognise the careful and elaborate definitions of a Doubleday or Westwood, rather than the childish guesses of a Hübner; and should quote the former as the authority for the genus, even should they, out of courtesy, have adopted the names of the latter. I think too, that until they can agree among themselves to a new set of rules, English Naturalists should feel themselves bound to follow the rules adopted and confirmed by their national scientific Association, and strongly oppose any alterations of nomenclature not sanctioned by those rules. We are all agreed that change and instability of nomenclature are great evils. We should insist, therefore, that whenever one of these rules can be so interpreted as to avoid change, it should be done; and whenever there is any doubt as to the interpretation, the benefit of the doubt should be given to all names which have been in general use for a number of years. If this view is adopted, the proper course to be taken is to reinstate every name which of late years has been made to give place to one of Hübner's, and further, to treat the "Verzeichniss bekannter Schmetterlinge" as a mere catalogue which can never be quoted as an authority for genera. There is one other class of alterations made by Mr. Kirby for which I can find no rule, and which seems to me to have no advantages Whenever the genus from which a family name has been formed is abolished for any cause, he at once gives a new name to the family. Thus, having abolished Eurygona, *Bois.*, in favour of Euselasia, *Hübn.*, he changes Mr. Bates' sub-family Eurygoninæ into Euselasiinæ, and, for the same reason, our old friends the Erycinidæ are rebaptised Lemoniidæ. It will be remembered that for some years the genus Nymphalis was expunged from our catalogues, but no inconvenience or confusion was caused during that epoch by retaining the old family name of Nymphalidæ.

Looking at the varied opinions expressed and acted upon by

the several authors I have quoted, it becomes evident that we shall never obtain complete uniformity and permanence of nomenclature, as long as each writer of a monograph or compiler of a catalogue thinks himself at liberty to use it as a medium for expressing his own views on the subject. To enact laws is of little use if we have no judges to interpret them. I have long been of opinion that we require a tribunal to decide authoritively what changes of nomenclature shall be allowed; and though I have often been told this is impracticable, I cannot yet see the impracticability. As an example of what I mean, I would propose that the Natural-History Societies of each of the great nations of Europe and America should appoint one or more well-qualified naturalists to form a Judicial Committee of Nomenclature, all these societies, of course, agreeing to abide by the decisions of such committee. It might meet once a year, or even less frequently (as much business might be done by means of a Secretary), when any one could lay before it cases of non-accordant or erroneous nomenclature, with reasons and authorities for proposed changes. Its decisions, once given, would be adopted in the publications of all the societies, and this would soon lead to their universal adoption. Authors working at monographs or catalogues would naturally submit to it all proposed alterations of existing nomenclature, and would hardly run the risk of injuring the sale of their books by acting in opposition to the judgments given. All cases in which an important principle was involved should be decided only after submitting it to every member of the committee. The decisions of the committee need not be absolutely final, because new evidence might turn up, or the application of a rule might involve consequences not foreseen; but the confusion caused by the reversal of a decision would be carefully considered, and such reversals should not be made, except by a larger absolute majority of the committee than that which gave the previous decision. Such a committee would, of course, lay down certain principles and rules for its own guidance, calculated to secure a uniform and permanent scientific nomenclature of natural objects; and with the great facilities for communications that now exist, I cannot believe that there would be any great difficulty in its practical working; still less can I believe that its decisions would not be respected, and that it would not help us to obtain, much earlier than we otherwise should do, a uniform and permanent nomenclature.

The interesting problem of what is the true ancestry of Insects, and which line was taken in their progress of development, is one which has of late been much discussed. Sir John Lubbock, following Brauer, indicates Campodea, a curious larval form, allied to Thysanura and Collembola, as the nearest existing representative to the ancestral type of the Insecta. The mouth of these insects is neither truly suctorial nor mandibulate, and thus affords a starting point for special modification in both directions. The larvæ and pupæ of the higher insects are certainly not mere lower stages in the progressive development of the imago, as was once supposed, but are highly specialized forms, which, during a long series of ages, have diverged so as to become adapted to widely different modes of life. They are not likely, therefore, to represent ancestral types, which must rather be looked for in certain exceptional developmental forms, such as the hexapod larvæ of Meloë for example. Dr. Packard endeavoured, nearly two years ago, to carry the solution of the problem one step further back. He believes that the Insecta and Crustacea have been independently evolved from some low annulate animals; the Insecta passing through a rudimental form to which he gives the name Leptus, analogous to the well-known Nauplius form of Crustacea. The Myriapods he believes to have descended from a Leptiform animal, something like the young of Pauropus;—the Hexapods from one more resembling the young of Stylops and Meloë, and certain low Orthopterous and Neuropterous larvæ. Dr. Anton Dohrn is now engaged in a systematic study of this subject, taking, as his basis, the maxim that the development of the individual is a short and incomplete statement of the development of the race; and working out the embryology of as many types as possible, so as to discover how far their earliest stages agree or disagree. He has hitherto principally occupied himself with the Crustacea, but seems inclined to revive the old idea of the possibility of finding homologies between the Annulose and Vertebrate types. The Russian anatomist Kowalewsky holds somewhat similar views, but they seem to be founded on the supposed histological identity of certain internal organs and tissues, rather than on any accurately determined homologies in the great structural features of each sub-kingdom.

Amid all the discussions to which this subject has given rise, it

is to me surprising that one of the most ingenious and remarkable theories ever put forth on a question of Natural History has not been so much as once alluded to. More than six years ago, Mr. Herbert Spencer published, in his 'Principles of Biology,' a view of the nature and origin of the Annulose type of animals, which goes to the very root of the whole question; and, if this view is a sound one, it must so materially affect the interpretation of all embryological and anatomical facts bearing on this great subject, that those who work in ignorance of it can hardly hope to arrive at true results. I propose, therefore, to lay before you a brief sketch of Mr. Spencer's theory, with the hope of calling attention to it, and inducing some of you to take up what seems to me to be a most promising line of research; and, although the question is one on which I feel quite incompetent to form a sound judgment, I shall call your attention to the light which it seems to throw on some of the most curious anomalies of insect structure.

The theory itself may be enunciated in very few words. It is, that insects, as well as all the Annulosa, are not primarily single individuals, but that each one is a compound, representing as many individuals as there are true segments in the body, these individuals having become severally differentiated and specialized to perform certain definite functions for the good of the whole compound animal.

Mr. Spencer first calls attention to the fact, that among the undoubtedly compound animals (which are almost all found in the sub-kingdoms, Cœlenterata and Molluscoida) the several individuals are rarely combined in such a manner as to necessitate any physiological division of labour among them. The associated individuals of a Hydrozoon or an Ascidian are each free to spread their tentacles, to draw in currents of water, and to select their food, without in any way interfering with each other, because the compound animal is either branched or approximately hemispherical, and thus there is no necessity for any of the combined individuals to become especially modified with regard to the rest. But should a compound animal have its component individuals arranged in a linear series, there would most probably arise a marked difference of conditions between the two situated at the extremities and those between them. If they remained united, some modification must have occurred to adapt each to its condition. But if, further, the series should be fixed at one end,

the other being free, a new differentiation must arise; for the two ends being very differently situated, the intermediate ones will also differ accordingly as they are nearer one end or the other. Here there is a cause for the differentiation of united individuals that does not exist in any branched or other symmetrical arrangement than a linear one. Some of the Salpidæ show such a rudimentary linear aggregation, but their mouths and vents being lateral the individuals are so similarly situated that no differentiation need occur. A little consideration will show us that this is one of those cases in which perfectly transitional forms are not be expected. A permanent union of individuals in a linear series, such as to necessitate differentiation of function among them, could only be effected by a series of co-ordinated gradations, each of which would have so great an advantage over its predecessor as to necessitate its extinction in the struggle for existence. We cannot expect to find the union without the differentiation, or the differentiation without the complete union; and it will, therefore, be impossible to prove that such was the origin of any group of animals, except by showing that numerous traces of separate individualities occur in their organization, and cannot be explained by any of the known laws of development or growth in animals not so compounded.

In the structure of the lower Annelids we do find strong indications of such an ancestral fusion of distinct individuals. These animals are composed of segments, not merely superficial, but exhibiting throughout a wonderful identity of form and structure. Each segment has its branchiæ, its enlargement of the alimentary canal, its contractile dilatation of the great blood-vessel, its ganglia, its branches from the nervous and vascular trunks, its organs of reproduction, its locomotive appendages, and, sometimes, even its pair of eyes. Thus every segment is a physiological whole, having all the organs essential to life and multiplication. Again, just as other compound animals increase by gemmation or fission, so do these. The embryo leaves the egg a globular ciliated gemmule; elongation and segmentation then take place, always in the hinder part, so as to elongate the compound animal without interfering with the more specialized anterior segment. In the Nemertidæ, and some Planaria, spontaneous fission occurs, each part becoming a perfect animal, and in the Tænia this is the usual mode of reproduction. The account given

by Professor Owen in his 'Comparative Anatomy of Invertebrates' is very suggestive of Mr. Spencer's view. He says—"On the first appearance of the embryo annelid it usually consists of a single segment, which is chiefly occupied by a large mass of unmetamorphosed germ-cells. And these are not used up, as in higher animals, in developing the tissues and organs of an undivided or individual whole, but, after a comparatively slight growth and change of the primary segment, proceed in the typical orders to form a second segment of somewhat simpler structure, and then repeat such formations in a linear series, perhaps more than a hundred times. So that we may have a seeming individual annelid, consisting of many hundred segments, in which a single segment would give all the characteristic organization of such individual, except some slight additions or modifications, characterising the first and last of the series." He also tells us that spontaneous fission has now been observed to take place in almost every order of Annulata; and, in many, artificial fission produces two distinct individuals. In some cases the compound animal consists of very few segments, three only in the genus Chætogaster, the fourth always separating as a zooid, and forming a new animal. In the higher Articulata, the process of gemmation goes on to a considerable extent in the egg, and even afterwards in some cases, but more or less irregularly. Thus the larva of Julus is hatched with eight segments, and at the first moult it acquires six new ones, which are added between the last and the penultimate.

The gradual fusion of the once distinct individuals into a complete unity, is shown in a very interesting manner as we advance from the lower to the higher forms. In the Annelida, Dr. Carpenter tells us, the spiracles of each segment are separate, and do not communicate internally with those of other segments. In the Myriapoda they partially communicate, while in the Insecta they communicate perfectly by a system of anastomosing vessels. The same thing is indicated by the various positions of the chief spiracles. In Smynthurus among the Poduridæ there are only two, opening under the side of the head immediately beneath the antennæ. In Solpugidæ (Arachnida) they are situated between the anterior feet; in some spiders they open near the end of the abdomen, in others at its base. The position of the mouth and eyes at the anterior extremity of the body, and the

vent at the posterior, are obviously what would arise as soon as any specialization of function in the series of zooids occurred. It is not, therefore, surprising that we never find these change their position. But for the respiratory and generative organs there is no such necessity for fixity of position, and as *they* existed originally in every segment, we can well conceive how, as articulate forms become more and more modified, it would sometimes be useful to the compound animal for these organs to become abortive or developed in different parts of the body. We have seen that this is to some extent the case with the former organs, but it occurs to a much greater extent with the latter.

The most generalized form is to be seen in the intestinal worms, each segment of which possesses a complete hermaphrodite reproductive apparatus; so that, in this respect, no less than in their capacity for spontaneous fission, these creatures are really what we should expect the early type of compound animals to be. This, however, is a rare case, but even in the much higher leeches there are testes in no less than nine of the segments, and Dr. Williams discovered a direct passage from the spermatheca to the ovaries, which seems to indicate internal self-fertilization. It is, however, in the lower Arthropoda that we find the most curious diversities in the position of these organs. In the Glomeridæ the genital openings in both sexes are situated in the third segment, just behind the insertion of the second pair of limbs. In the Polydesmidæ the female organs are in the third segment, while those of the male are in the seventh segment. In Julus the same organs are situated in the fourth and seventh segments respectively. The Chilopoda, on the other hand, have them near the end of the body, as in most insects. In the Acarina the ovaries open on the middle of the abdomen or on the under side of the thorax, either between or behind the last pair of legs. In spiders the seminal orifice is at the base of the abdomen, but the palpi are the intromittent organs; these are spoon-shaped, and are besides armed with horny processes, hooks, and other appendages, and must be looked upon as true generative organs. In the Astacidæ the sexual organs of the male are at the base of the first pair of abdominal legs, those of the female at the base of the third pair. Among the true winged-insects there is one remarkable case of abnormal position of these organs, in the

dragon-flies, which have the seminal vessels in the ninth, while the complex male sexual organs are situated in the second, abdominal segment. It is interesting to note that this curious anomaly occurs in an order which is considered to be of the greatest antiquity and most generalized type among the true insects.

There are many other facts of a similar character to those I have now touched upon, and they all become clearly intelligible on the theory of Mr. Spencer, that the Annulosa are really compound animals, or, as he expresses it, "aggregates of the third order;" while the other great groups of highly organized animals —Mollusca and Vertebrata—are typically simple animals, or "aggregates of the second order," (the cells of which their structures are built up being "aggregates of the first order"). Nothing of a similar character is to be found among the two latter groups. No molluscous or vertebrate animal can be divided transversely so that the separate segments shall be in any degree alike, and contain repetitions of any important organs. The distinct separation of parts in the vertebral column has been acquired, for it is less visible in the lower types than in the higher (the reverse of what obtains among insects), and in the lowest of all is quite absent; while in none is there any corresponding multiplicity or displacement of respiratory, circulatory, or generative organs. The vertebral column corresponds rather to the segmented shell of the Chiton, and has no more relation than it to the essential plan of the more important vital organs. Neither does any mollusk or vertebrate undergo spontaneous fission, nor that complete and progressive segmentation in the process of developmeut which is characteristic of all Annulosa; nor do they ever exhibit the phenomena of parthenogenesis or alternation of generations, the essential feature of both which is, that numerous individuals are produced from a single fertilized ovum, by a process analogous to (or perhaps identical with) ordinary gemmation, and both which phenomena sometimes occur even among the higher insects.

In concluding this short sketch of a remarkable theory, I would observe, that if it is a true one it at once invests the objects of our study with a new and exceptional interest; because they are the most highly developed portion of a group of animals which will, in that case, differ fundamentally in their plan of structure from all other highly organized forms of life. In the study of the habits, instincts, and whole economy of insects, we shall have to

keep ever in view the conception of a number of individualities fused into one, yet perhaps retaining some separateness of mental action, a conception which may throw light on many an obscure problem, and which will perhaps materially influence our ideas as to the nature of life itself. We must remember also, that if the insect is really a compound animal, then the only true homology that can exist between it and a vertebrate, or a mollusk, will be one between a single segment and an entire animal, and the search after any other will be so much lost time. Especially must the acceptance of this theory have an important bearing on all embryological and genetical studies; and if the facts and arguments adduced by its learned and philosophical author do make out even a *prima facie* case in its favour, it must deserve the careful and unbiassed consideration of all who endeavour to solve the problem of the origin of insects.

I have now, Gentlemen, only to express my satisfaction that, at the expiration of my term of office, I leave the Society in at least as flourishing a condition as that in which I found it; for, although I feel that none of its success is due to my individual exertions, yet some of the responsibility of misfortune might have fallen upon me. The Entomological and all similar Societies may be compared to such a compound animal as Mr. Spencer's insect, and its success will depend upon its component members being sufficiently numerous and sufficiently differentiated in character to perform energetically all the functions which maintain its life, and at the same time sufficiently combined and integrated to work harmoniously together for the good of the organism. The officers with whom I have had the pleasure of being associated during the past year, make, I venture to suggest, a near approach to this high ideal; and although I have been but an inefficient head to a body which is, so to speak, engaged in a constant struggle to maintain a healthy and useful existence, yet your kind consideration has always made it a pleasure for me to fulfil, to the best of my ability, the duties of the honourable office to which you elected me.

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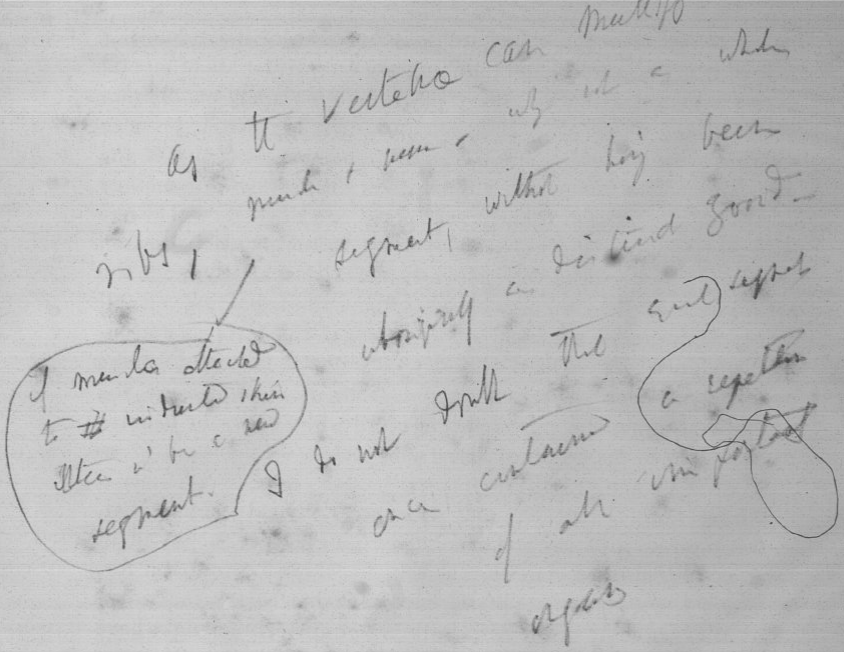

Sketch of A. Spencer's
views of evolution
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