

It is thus seen that *Hamingia* is really intermediate in its combination of characters between *Bonellia* and *Thalassema*.

Owing to their not having known the frontal hood or proboscis of *Hamingia*, Koren and Danielssen have somewhat overestimated the closeness of its relationship to *Bonellia*. On the whole it may be said that *Hamingia* has in internal organs a closer resemblance to *Bonellia*, in external shape and characters a closer resemblance to *Thalassema*.

The feature in which it is quite peculiar is in the absence of genital setæ in the female and the correlated existence of one or of two prominent papillæ which carry the genital pore or pores.

Summary.—The new facts which have been above recorded additional to the observations of Koren and Danielssen and Horst are briefly as follows :—

1. *Hamingia arctica* occurs on the Norwegian coast in latitude 60°, and at the comparatively small depth of 40 fathoms.

2. *Hamingia* has a frontal hood or proboscis resembling that of *Thalassema*, which is easily broken off as in *Thalassema* and *Echiurus*.

3. The corpuscles of the perivisceral fluid of *Hamingia arctica* are coloured red by hæmoglobin.

4. The male of *Hamingia* is a diminutive parasite living upon the female, as in the case of *Bonellia*; it is provided with a pair of large genital setæ, although such setæ are absent in the female.

5. Though usually there are two, yet there *may* be only one uterus and one genital pore, as in *Bonellia*.

V.—*The Theory of Mimicry and Mimicking Theories.*

By W. L. DISTANT.

IN the last issue of this Magazine (vol. x. p. 417) an article on the interesting subject of "Mimicry between Butterflies of Protected Genera," by Mr. R. Meldola, appears to be inspired by two short opinions of my own published elsewhere; and as the author has done me the honour of subjecting those views to a critical and somewhat trenchant analysis, it becomes necessary to point out that some of his strictures (in the present absence of supporting facts) appear to belong to the armoury of what may be called "forensic biology," and represent arguments which may ultimately prove to be both

important and true, but which at the present time are of a purely speculative character.

After a careful perusal of Mr. Meldola's article, it appears also, and to my surprise, that it is necessary for me to repeat that, from the time I was cognizant of the theory of "Mimicry," as formulated by Mr. Bates, as understood and enunciated by Mr. Darwin*, and proved by the recorded observations of naturalists, and the corroborative explanation given thereby to previously inexplicable entomological phenomena, I could not but believe, and have always expressed my faith, in that doctrine. It was, however, always clearly perceived that "mimicry," like its far greater and parental relative "natural selection," though affording an answer to a great mass of hitherto inexplicable biological phenomena, still did not explain every thing; and few evolutionists would, in the present state of our knowledge, expect such a consummation; and the extension of the theory of "mimicry," on lines not laid down by its founder, and unsupported by facts, must still, however reasonable in appearance and desiderated in philosophy, bear the same amount of healthy scepticism that has hitherto helped to make our knowledge what it is. Judging from the careful, painstaking, and cautious observations made by those two distinguished naturalists, A. R. Wallace and Fritz Müller (on whose behalf Mr. Meldola appears as an advocate), I think we may conclude that they also would not express impatience at usual scientific caution.

In the spring of this year Mr. Wallace published† a statement of the expressed views of Fritz Müller as to a possible extension of the theory of mimicry amongst butterflies of the same genus, which he accepted as an explanation of what he had hitherto understood with Mr. Bates as due to "unknown local causes." In the course of a most interesting argument (for Mr. Wallace is a travelled naturalist and has worked as a specialist in Rhopalocera) he stated that though it had been "suggested that young birds have an hereditary instinct, enabling them to distinguish uneatable butterflies antecedent to experience," yet it seemed "in the highest degree improbable." Upon this point alone, without reference to the other portion of the subject, I thought it at least opportune to remind Mr. Wallace ‡ of what I felt he must be aware, but had probably for the moment overlooked, viz. the very careful experiments made by the late Mr. D. A. Spalding in proving the inherited acquisition of ideas and experience in young chickens.

* 'Descent of Man,' 2nd edit. p. 323.

† 'Nature,' vol. xxvi. p. 86.

‡ 'Nature,' vol. xxvi. p. 105.

It will, however, be well, in the first instance, to deal with the term "instinct." As by some of the old French philosophers unlearned in geology the existence of fluviatile or marine organic remains on mountain-top or inland highland was denied for fear they should be used as arguments for the "Noachian flood," so, on the other hand, was the phenomenon called "instinct" often denied, in order to discountenance the views of the teleologist. Now, as Mr. Meldola has appealed to psychology, he will probably agree with me in accepting Mr. Spencer's doctrine of "inherited acquisition" as the best explanation of what we at present understand by "instinct;" and we can then estimate how far Mr. Spalding's experiments went to show that there was an inherited acquisition of ideas and experience in young chickens and turkeys to recognize and avoid inedible and sting-possessing insects.

It is unnecessary to occupy space by describing the painstaking and accurate method pursued by Mr. Spalding in these investigations. Both chickens and turkeys gave evidence of "instinctive fear of these sting-bearing insects;" but, as the investigator candidly admitted, and as I quoted him, "the results were not uniform, and perhaps the most accurate general statement I can give is, that they were uncertain, shy, and suspicious." Now it seemed to me then (and I cannot say that Mr. Meldola has removed the impression), that if young poultry, not dependent upon insect food, can yet exhibit such strongly inherited acquisitions of ideas and experience in recognizing inedible insects (Mr. Spalding showed that they at once and with avidity attacked flies), it is not unphilosophical to predicate a much greater excess of the same in purely insectivorous birds in a state of nature.

As regards facts, we have the evidence of Bates and Belt, which has been stated with due force by Mr. Wallace himself*, that the *Heliconidæ* do possess an immunity from the attacks of birds, lizards, and predaceous flies; and through Dr. Müller has sent home a specimen of a *Heliconius* "which had apparently been seized when at rest by some bird, as there is a notched piece bitten out of the two fore wings," and Mr. Meldola possesses a cabinet-specimen "which is notched on both hind wings," I still think we require further evidence before accepting the novel view of "psychological ontogeny" in butterflies; and without these facts, which every candid biologist and entomologist will gladly accept when forthcoming, there is little benefit accruing to science by

* 'Natural Selection,' p. 79.

objecting to its being left as a reasonable but unproved hypothesis.

The second and larger portion of Mr. Meldola's article refers to some remarks made in my 'Rhopalocera Malayana,' respecting two species of the genus *Euplœa*. Mr. Meldola has so very fairly and accurately copied my words that I prefer to leave them in context with his own views, and have nothing to add or retract; and as he has concluded that in the Malay Peninsula the scarce *E. Distanti* is the mimic of the somewhat abundant *E. Bremeri*, I will only make the following remark:—*E. Distanti* is found both in the Malay Peninsula, Java, and Sumatra, whilst *E. Bremeri* is unknown from the last two habitats, though plentiful in the first. Consequently in Java and Sumatra it mimics a species which does not exist nearer than in the Malay Peninsula (that is, accepting this "mimicry" hypothesis)*. Mr. Meldola has omitted to take into consideration these divergent elements of locality, though he will find the habitats given in the publications from which he has quoted. To prove his point he has, with the mathematical skill of which he possesses no common endowment, given a numerical statement and argument which, if figures could prove biological hypotheses, would leave nothing to be desired. However, "Nature" does not readily unfold herself to this method; and it must not be forgotten that Kramer has used the same artificial means in an anti-Darwinian sense†.

The genus *Euplœa*, like several of the other large and protected American genera, exhibits groups of species with a common facies, which, at the present time, does not appear to be explained by this proposed extension of "mimicry." It is a question that is now, and has for a long time been, engaging the attention of some of our best lepidopterists, and can only be dealt with patiently and with all the facts. Such collections as are now being formed of the difficult and simulating species of the Central-American genera by Messrs. Godman and Salvin, and the results of their exhaustive examination of the same, will be, and must be, studied for an elucidation of the question. Without specimens and without special knowledge the delicate questions which are based on genera and species, as such, can scarcely be fully estimated, much less explained. My reference to the question whether these two species of *Euplœa* could be brought under the law of mimicry was due to the fact that a prominent and very excellent Eastern lepidopterist, who is specially studying that

* Of course it may be argued that the model *E. Bremeri* has become extinct in these regions.

† See abstract of same in Semper's 'Animal Life,' p. 366.

and some allied genera, had confided to me his opinion that many genera had been confused under one, and the resemblances of the species were due to mimicry. This in no way refers to views published by Fritz Müller or held by Mr. Meldola, as the contention of the entomologist in question is, that the two species do not belong to the same genus, in which he is supported by another and no inconsiderable authority; and therefore it is necessary for Mr. Meldola to decide this point, and agree with me that both species belong to one genus, before he can bring their resemblances under Fritz Müller's argument.

In discussing the possibility of "mimicry" between the two species, I remarked that in that view "we must presumably consider *E. Distanti* as the mimicked species, as it possesses a pseudo scent-gland, which may reasonably be considered as adding to its protective or uneatable character" &c. This Mr. Meldola refers to as a fallacious position, and states that "there is not the least warrant for the supposition that scent-glands or tufts have any thing to do with distastefulness," and further remarks that, as such organs exist in one sex only*, it is strongly suggestive, if not demonstrative, of the view that they are *secondary sexual characters*, and as such they are regarded by Dr. Fritz Müller.

Now, on reference to Dr. Müller's paper, to which we are directed, and which was communicated and edited by Mr. Meldola himself, we read, "the male of *Ituna* sometimes protrudes his tufts, when he is seized; so that in this butterfly the odour may serve *both to repel enemies* and to allure females"†. In discussing the scent-pouches on the posterior wings of *D. erippus*, Dr. Müller remarks that, as these organs "open only by a narrow slit, odours could hardly be freely emitted," and asks, "Might not the tufts be introduced into the pouches to be impregnated there with odoriferous matter?"‡ If so, for what purpose? Presumably for the reason given for the scented tufts of *Ituna*. Mr. Bates has also borne witness that species of *Lycorea* and *Ituna* have exsertible glands near the anus, which are protruded when the insects are roughly handled, and that "it is well known that similar organs in other families (Carabidæ, Staphylinidæ) secrete fetid liquids or gases and serve as a protection to the species"§.

* "In *Thyridia megisto*, according to Dr. F. Müller, the character of the odoriferous tuft has been transferred to the female, though in a less developed and weaker form."—Transl. by Meldola, Proc. Ent. Soc. 1879, p. xxii.

† Trans. Ent. Soc. 1878, p. 213.

‡ *Ibid.*

§ Trans. Linn. Soc. xxiii. p. 510.

I have written the above with considerable reluctance—first, because it partakes more of the nature of biological controversy than of any acquisition to our knowledge; and secondly, because I share with my old friend and late colleague, R. Meldola, so much in common in the points discussed and admiration for his sanguine and bold attachment to advanced theories and conclusions, for which his severe training in more than one branch of science and great natural abilities particularly fit him. I still, however, believe that “original work” is distinct from “original guessing,” and that the most advanced evolutionist may be excused if, though he bases his conclusions on the first, he withholds his assent to the last whilst in the uncorroborated stage; and in the present discussion this is neither restricting the “original theory within such narrow limits that no philosophical entomologist can possibly accept [the] interpretation,” nor does it indicate “a retrograde step which few scientific entomologists will be disposed to take.”

VI.—*Description of a new Genus of Cœciliæ.*

By G. A. BOULENGER.

THE following species is the second of the order Apoda discovered in East Africa. It is the type of a very marked genus, presenting a curious combination of characters. Its nearest ally I consider to be *Gegenophis*, from Malabar, which has likewise the skin scaleless and the eyes hidden under the cranial bones; but it is well distinguished by having the squamosal bones in contact with the parietals, two series of teeth in the lower jaw, and by the structure of the tentacle.

SCOLECOMORPHUS, g. n.

Squamosals separated from parietals. A single series of teeth in the lower jaw. Eyes overroofed by bone. Tentacle flap-shaped, situated below and slightly behind the nostril. No scales.

Scolecomorphus Kirkii, sp. n.

Teeth very small, subequal. Snout very prominent, rounded. Tentacle on a large oval swelling situated on the lower surface of the snout. Body slender; 152 circular folds, all interrupted on the dorsal and ventral lines. Tail indistinct, rounded. Dark olive above, brownish olive beneath. Total length 270 millim.; greatest diameter of body 7 millim.

A single specimen, obtained through Sir J. Kirk, probably from the vicinity of Lake Tanganyika.



Distant, William Lucas. 1883. "V.—The theory of Mimicry and Mimicking theories." *The Annals and magazine of natural history; zoology, botany, and geology* 11, 43–48. <https://doi.org/10.1080/00222938309459090>.

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