

the Lallemand Prize to André Rochon-Duvigneaud, for his book on the eye and vision in the vertebrates; the Vaillant Prize to Henri Colin, for the whole of his work in plant physiology; the Hollevigue Prize to Léon Brillouin, for his researches and works on modern statistical mechanics; the Jean Jacques Berger Prize to Roger Boutteville, for his work in public lighting and hygiene; the Saintour Prize to Louis Dubertret, for his geological work and especially for his geological map of Syria; the Jules Mahyer Prize to Pierre Humbert, for the whole of his work in mathematical analysis; the Lonchamt Prize to Mme. Marguerite Lwoff, for her memoirs on nutrition of the Trypanosomides, and André Lwoff, for his memoir on the significance of hæmoglobin for the flagellated parasites; the Wilde Prize to André Duparque, for the whole of his work on the structure and petrographical characters of coal; the Caméré Prize to Jean Aubert, for his work concerning a new system of mobile barrage; the Thorlet Prize to Paul Dorveaux; the Albert I. of Monaco Prize to Jean Tilho, for his researches on the hydrography of the Lake Tchad region; the Marquet Prize to Frédéric Joliot and Mme. Irène Joliot, for their discovery of temporary radioactivity.

Special Foundations.—The Lannelongue Foundation to Mme. Gabriel Cusco; the Hélène Helbronner-Fould Prize to Mme. Pierre Savorgnan de Brazza.

Grand Ecoles Prizes.—The Laplace Prize to Jean Couture; the L. E. Rivot Prize between Jean Couture, Louis Eyssautier, Michel Legrand and Yves Monneret.

Grants for Scientific Researches.—The Gegner Foundation to Camille Vallaux, for his oceanographic work; the Jérôme Ponti Foundation to Jean Thibaud, for his method of concentrating electrons in the magnetic field; the Hirn Foundation to Gonzague Dubar, for his work on the stratigraphy and palæontology of the Lias, especially in the Pyrenees and Morocco; the Becquerel Foundation to Yves Rocard, for his work on the kinetic theory of gases and on optics.

The Loutreuil Foundation.—Out of thirty-five applications, the consulting committee has chosen the following:

Researches on definite problems.—Pierre Viala (6,000 francs), for his work on the parasite of the *Court-Noué* of the vine; André Aron (2,000 francs), for his researches on the magnetic properties of thin sheets of nickel; James Basset (5,000 francs), for experimental researches on ultra-pressures; Paul Henri Fleuret (2,000 francs), for the study of ketogenesis and oxaluria. Edmond Guillermet (3,000 francs), for his studies on electrolysis in solvents other than water; Mme. Louis Nouvel (4,000 francs),

for work in a maritime laboratory; Marcel Petit (4,000 francs), for his researches on the molars of Equideæ; Maurice Pierre (3,000 francs), for his researches on the rôle of the different physical and mechanical factors governing swallowing, vomiting and ruminating; Henri Simonnet (9,000 francs), for his researches in plant toxicology; André Wahl (3,000 francs), for the continuation of his work relating to tinctorial chemistry.

Researches to be carried out in France overseas and countries under French mandate.—Roger Heim (12,000 francs), as a contribution to the expenses of a voyage to Madagascar for the study of the cryptogamic flora and various diseases of trees and cultivated plants; Antoine Poidebard (7,000 francs), for his geographical studies by photography from the air in the Syrian desert.

Purchase of Laboratory Material.—René Dubrisay (10,000 francs), for the purchase of a Jobin and Yvon spectrograph.

Publications.—*Annales des sciences naturelles* (5,000 francs), for the publication of special volumes commemorating the centenary of this publication; Camille Arambourg (6,000 francs), for the publication of the scientific results of his Omo expedition; Comité de physique du globe des colonies (10,000 francs), for assisting the publication of its *Annales*; Fédération Française des Sociétés de sciences naturelles (5,000 francs), for the publication in the "Faune de France" of the memoirs of Seguy on the Acalypters and of Brolemann on the Diplopods.

Grants to Libraries.—Académie d'agriculture de France (5,000 francs), for assistance with its catalogue; Bibliothèque nationale et universitaire de Strasbourg (5,000 francs), for printing a catalogue of its periodicals; Ecole nationale vétérinaire de Lyon (5,000 francs); Ecole nationale vétérinaire de Toulouse (4,000 francs); Ecole Polytechnique (5,000 francs); Institut national agronomique (5,000 francs).

The Mme. Victor Noury Foundation to Raymond Poisson (3,000 francs), for his studies in protistology; Paul E. Thomas and Paul de Graëve (3,000 francs), for their work in biological chemistry; Mme. Edouard Salles (3,000 francs), for her studies on terrestrial magnetism; Edouard Lamy (2,500 francs), for the whole of his malacological work; Michel Volkonsky (2,500 francs), for his work in cytophysiology and plant physiology. The Le Chatelier Foundation to René Paris, for carrying out researches on the devitrification of glass. The Frément Foundation (2,500 francs) to Pierre Vernotte, for studies on the propagation of heat either by conduction or convection. The Roy-Vaucouloux Foundation to the Institut Marey.

Attacks of Birds upon Butterflies

CRITICS of the current theory of mimicry, but only so far as butterflies are concerned, claim that published records are insufficient to establish birds as the agents which may be considered mainly responsible for the production of mimetic resemblance in butterflies by preferential feeding. The following observation, communicated to me by Mr. T. H. E. Jackson, of Kitale, Kenya Colony, is therefore of great interest to all students of natural selection. Early in the present year, at Bulumbe camp in Busia, in the eastern province of Uganda, he noted on

the first night "a few wings of butterflies lying about but it was not until next morning that the truth dawned on me. I then found that the ground was literally strewn with wings. There were four or five large *Spathodea nilotica* trees in the compound and swarms of butterflies were feeding on the flowers. Watching them that morning for birds I saw one swoop down on a *Papilio bromius* and take it off to a bare branch where it proceeded to beat off the wings, devouring the body only, and then returned to the tree for more. I made a list on paper of the butterflies present and only afterwards thought of

collecting the wings themselves as evidence: one *Acraea* we could not find again".

The following table gives Mr. Jackson's notes, together with the results of examining the wings sent by him. The number of *specimens* was reckoned by counting the maximum number of fore wings, right or left, whichever was the greatest.

Species present	Prevalence	Wings found	Estimated (minimum) number of specimens eaten (by wings sent)
Papilionidae.			
<i>Papilio dardanus.</i>	Very common.	Plentiful.	Males, 5.
Female form <i>hippocooides</i> .	About equal numbers seen or taken.	A few.	Female form <i>hippocooides</i> , 2.
" " <i>planemoides</i> .		None.	Males, 14. Females, 9.
<i>Papilio bromius</i> .	Very common.	Plentiful.	(An uneaten specimen with wings much torn also found.)
<i>Papilio nireus.</i>	A few.	A few.	Male, 1. Female, 1.
<i>Papilio phorcus.</i>	A few.	A few.	Males, 2. Female, 1. Female form <i>ther-sander</i> , 1.
Pieridae.			
<i>Mylothris poppaea.</i>	Common.	None.	Males, 2.
<i>Eronia thalassina.</i>	Common.	Of two specimens.	Male, 1.
<i>Eronia argia.</i>	A few.	Of one specimen.	
Nymphalinae.			
<i>Charaxes brutus.</i>	A few <i>Charaxes</i> flying round trees and wings recovered of those mentioned, one or two of each.	One or two.	Male, 1.
<i>Charaxes castor.</i>			Males, 2.
<i>Charaxes etesipe.</i>			Females, 2.
<i>Charaxes tiridates</i> or <i>numenes.</i>			Female, 1.
<i>Charaxes theocles.</i>			Female, 1.
<i>Cyrestis camillus.</i>	Common, but lower down on under-sides of leaves.	One or two.	One.
<i>Precis westermanni.</i>	Common.	A few.	Male, 1.
Acraeinae.			
<i>Acraea pharsalus,</i>	Very common.	Wings of three only discovered after very careful search.	One male, whole except for head, and one right hind wing, of <i>A. egina</i> .
<i>Acraea viviana.</i>			
<i>Acraea egina.</i>			
<i>Acraea encedon.</i>			

is supplied by the small numbers of wings of these very common insects found on the ground. One specimen "which is perfect except for the head was actually dropped at my feet under the tree while I was collecting the wings". It must be said, however, that the specimens sent comprised a *Papilio bromius*, the body of which was undamaged although the wings were torn. *Acraea egina* is extremely abundant, black and scarlet; the less common *pharsalus* is of the same colour; *encedon* and *viviana* are yellowish or brownish; they have all the characters demanded of species relying upon brilliant colours to advertise distasteful qualities. It is highly suggestive that the female *dardanus* which has an acraeine appearance was untouched.

(4) The large-bodied *Charaxes* (allied to our 'Purple Emperor' in habits) were evidently in demand, for wings of all the species seen were picked up. This confirms the evidence of Mr. C. F. M. Swynnerton¹.

(5) Some of the 'Whites' (Pieridae) were common, but apparently not greatly in favour. The two *Eronia* are white or greenish white; the *Mylothris* has a brilliant orange patch at the bases of the wings which is generally held to be an example of 'warning colour'; like *Acraea*, *Mylothris* is typically aposematic in habit, is mimicked by

other butterflies, and is known by experimental evidence to be relatively distasteful. It will be noted that *M. poppaea*, 'common', was not attacked, while *Eronia* was.

(6) This most interesting and valuable observation does not support the statement so strongly emphasised by Mr. W. L. McAtee² that "predation takes place much the same as if there were no such thing as protective adaptations" and that "there is utilization of animals of practically every kind for food approximately in proportion to their numbers".

(7) Regarding published records, the difficulty has been in the past that many experienced naturalists have not thought it worth while to record the details of what they consider to be a "commonplace occurrence"³. The Hope Department, Oxford University Museum, has put together a body of evidence in the form of beak-marks upon the wings, which are constantly being discovered now that their appearance is recognised. During recent years, descriptions of many such have been published in the *Proceedings of the Royal Entomological Society of London*.

(8) It has been said that migrations of butterflies should afford evidence, if butterflies are devoured by birds to an appreciable extent. Observations on this have been published, but attention may be directed here to notes in a recent book of travel⁴.

G. D. HALE CARPENTER.

The following points deserve comment:

(1) Several wings show such clear beak-marks that it was possible, through the kindness of Mr. N. B. Kinnear of the British Museum, to compare them with imprints of the beaks of birds made by pinching soft paper between the mandibles, as was first suggested by Mr. C. L. Colletette. The description of the birds given by Mr. Jackson, whose ornithological knowledge unfortunately was not equal to his entomological, suggested a species of drongo. "The birds were black and smallish without markings that one could distinguish: there were eight or nine of them." But impressions from drongos, or black flycatchers, were shorter and broader than the marks on the wings, and the nearest approach came from a species of *Lamprocolius* (glossy starling): the numbers also favour that rather than a species of drongo.

(2) Mr. Jackson noted that "the butterflies present were first Papilios and Acraeas in about equal quantities". The Papilios comprised several black and green species, and *dardanus* with cream coloured male and two forms of mimetic female. The black and white *hippocooides* resembles a species of *Amauris* (Danainae), the other, *planemoides*, has a conspicuous orange band producing a likeness to a *Planema* (Acraeinae). The males and black and white female were eaten, the other female was not. "Both forms appeared to be equally common; we took four of the former and three of the latter, and saw one more of the latter. No models for either form were observed." The latter remark, of course, simply implies that the models were not feeding on the trees: *Amauris* is exceedingly common.

(3) Evidence that Acraeas are relatively distasteful

¹ Swynnerton, C. F. M., Third Internat. Ent. Congr., Zurich, 1925, Bd. 2, Weimar 1926, 494-500.

² McAtee, W. L., *Smithsonian Misc. Coll.*, 85, No. 7, 144, March 15, 1932.

³ *Proc. Ent. Soc. Lond.*, 6, 34; 1931.

⁴ Puxley, W. L., "Wanderings in the Queensland Bush", p. 59. (London: G. Allen and Unwin Ltd.)