STUDY OF IMMATURE STAGES AND FOODPLANTS

PRESIDENTIAL ADDRESS TO THE ELEVENTH ANNUAL MEETING OF THE LEPIDOPTERISTS' SOCIETY

Dear Fellow Members:

It is my great pleasure to be able to express my gratitude for having been chosen, for the first time from Asia, as the 11th President of the Lepidopterists' Society. In assuming this honorable post, I would like to thank all the members the world over and to pay my deep respects to Dr. J. H. McDunnough and all the other predecessors of mine.

It is a great pity that I am unable, on account of my official duties at home, to attend the present meeting in Colorado, which is by no means very far from Japan at this time of advanced æronautics. I wish the kind reader of this address will convey my best wishes to all those present and also my hearty congratulations on the success of this meeting.

Now, I would like to avail myself of this opportunity to introduce to you some aspects of Japanese lepidopterists' activities in brief. We Japanese certainly have access to references written in European languages, but since our works and achievements are publicized in Japanese, it is feared that they are not so well known abroad as European and American books and papers are to us. For one thing, there is a language difficulty on both sides, and for another one may consider the financial risk involved in the publication of these in foreign languages on the part of Japanese publishers. Therefore, I hope you might be interested to know something about the recent developments made in Japan in lepidopterology, especially in the field of butterflies and, in this connection, I would like to make a proposal at the end of my address.

Only two decades ago, immature stages of about forty percent, and some of them but incompletely, were known out of a total of some 180 species of butterflies inhabiting Japan proper. Until then, early stages of even some of the commonest had been undiscovered or at least unconfirmed in the isles of the Japanese Archipelago: for instance, those of only 3 were known among 14 fritillaries; likewise, 7 among 24 hairstreaks (Theclini), one species of the 10 so-called 'alpine' butterflies, and also one of the 6 aberrant-feeding lycænids, were known.

However, an upsurge of researches into butterfly life history, which originated around 1945, culminated ten years later, when almost all Japanese butterflies could be studied throughout their life-cycle. To return to the groups just mentioned: more than a dozen fritillaries had been finished up by 1952, and the numerous Hairstreaks were grappled

with by keen and ingenious lepidopterists including KEI HAYASHI, who introduced *en masse* the early stages of all but a few in a graphic supplement of the monthly insect magazine, *Shin Konchu*, 1956. Light was also thrown upon the mysterious larval life of aphytophagous lycænids one by one, beginning with the publication in 1949 of the life history of *Niphanda fusca*, the sixth and the last species, *Spindasis takanonis*, being finally conquered in 1954. In the meantime, the alpine butterflies of Central Japan were studied continuously by YUKIO TABUCHI, whose strenuous efforts of more than fourteen years crystallized in his superb photo book published in 1959 under the title of *Kozancho* or *Alpine Butterflies*. The newest of such life-history books is the *Early Stages of Japanese Butterflies in Colour, Part I.* by A. HARA and myself published in December 1960. This, together with the Part II which will soon be off the press, will provide you with information on practically all the known butterflies of Japan in every stage. These two volumes contain colored illustrations of 196 species in all, including several of southern origin found only on remote islands off the Kyushu mainland.

At the present moment, then, there remains a single species that still defies the continued painstaking searches by lepidopterists, in spite of the fact that the butterfly, though very rare, is an indigenous one known since long ago. It is one of the brilliant green Hairstreaks, *Chrysozephyrus hisamatsusanus*, and by analogy with congeneric species the larva of this butterfly has been supposed to feed on Fagaceæ, but so far there has been no positive proof of it. On account of the scarcity of the adults, the otherwise effective method of searching for eggs among twigs and branches in winter has not been successful. This method, developed in Japan recently, has been instrumental in the clarification of the life history of so many Green Hairstreaks. Details of it appeared in the *Journal of the Lepidopterists' Society*, Vol.13, No.3.

Now mention must be made of the activities of lepidopterists which made it possible practically to conquer in ten years or so all those untouched butterflies whose number had not dropped below 100 in the forties. At one time there were more than sixty hobbyists' clubs throughout the country, composed mainly of university and high-school students. Thanks to the encouragement as well as useful suggestions unsparingly extended by a few leading lepidopterists, those young students successfully attacked one species after another, publishing in their own mimeographed journals what they knew of its immature stages and foodplants. Meanwhile, the magazine *Shin Konchu* played the role of a bulletin-board for those journals and allowed some space for their introduction and excerpts every month. There is no telling how helpful this kind of exchange of information was, and it is no wonder that knowledge

and techniques thus acquired and accumulated bore rich fruit in a very short period of time. In his President's address in 1958 N. D. RILEY remarked: "When you discover new facts, publish them, don't let them die with you as is the reprehensible custom of so many otherwise excellent lepidopterists." As already mentioned, the young Japanese students *had* seen eye to eye with Mr. RILEY, and excellent co-operation having been firmly established between professionals and amateurs, Dr. EUGENE MUNROE, the 1959 President, was kind enough to say that "recent progress in Japan has also been exemplary."

The application of such common knowledge on the part of young lepidopterists knows no limits. For example, new localities and even new species have been found. It is particularly significant that whenever a new species was discovered, its life history was made known one year or two later. And starting from a mere study of life history, those students have gone so far as to engage themselves in the study of distribution, phylogeny, etc. Also, recently genetic studies have been undertaken, including line-breeding and interspecific cross-breeding. These activities and their results are necessarily exerting a strong influence on moth-lovers.

Those numerous hobbyists' clubs have certainly had their vicissitudes to date, but many of them have survived, or even prospered, and some of their journals are now neatly printed. Unfortunately, the *Shin Konchu* was discontinued for commercial reasons in the summer of 1959, without concluding Vol.XII. However, the two influential societies – the Lepidopterological Society of Japan and the Japan Heterocerists' Society – are issuing their journals, *Tyo to Ga* (= Butterflies and Moths) and *Tinea*, respectively. These two organs are open to the members wishing to contribute, and many new species as well as new forms and varieties have been introduced thereby. Articles on Lepidoptera also appear in *Kontyu*, journal of the Entomological Society of Japan. Among the local bulletins is *Cœnonympha*, issued by the Hokkaido Lepidopterists' Society.

In view of the recent progress made in butterfly biology in Japan, it may be said that initial stages of study owed much more to the emphasis laid on efforts to clarify what remained unknown, than to the dissemination of what was known. Here I would like to look around the world and pick up some species whose life history it is urgently needed to clarify. Among those I am going to enumerate there may well be some which have already been studied but, as far as I know, not yet come to the knowledge of lepidopterists the world over. A good example of this may be the homopterophagous habit of a common Japanese lycænid, *Taraka hamada*, which fact escaped European scholars' notice until recently, although its biology has been well known in Japan since 1898.

Needless to say, the study of immature stages and foodplants of a butterfly accompanies the possibility of obtaining a number of finest adult specimens. Academically, it assumes a far greater importance in the fields of phylogeny and taxonomy. Let us take a look at a conclusive chart of classification as made by Dr. PAUL R. EHRLICH in his "Comparative Morphology, Phylogeny and Higher Classification of the Butterflies" (1958). Among the 19 subfamilies given in it, there are four that are classified without endorsement of life history: viz., Baroniinæ (Mexico), Pseudopontiinæ (West Africa), Calinaginæ (Asia) and Styginæ (South America). Some information has since been obtained on Calinaginæ, but the other three monotypic subfamilies have as yet to be studied in all stages of metamorphosis before there is any final conclusion on their classification. We are also looking forward to information on immature stages and foodplants of such well-known species as *Druryia antimachus* of Africa, *Teinopalpus imperialis* of India, *Clothilda* spp. of Central America, many species of Riodinidæ found in South America, Lipteninæ of Africa, Poritinæ of tropical Asia, just to name a few.

The curious Indian swallowtail, *Teinopalpus,* has been known to depend on bushes of *Daphne*-species for its larval food, but the reference on which this information is based does not commit itself to the actual dietary life of the larva. Furthermore, it more or less depends on the study of biology whether *D. antimachus* is determined to be a close relative of *Ornithoptera,* or whether *Clothilda* should be classified under the Danaidæ. Too little is known about the life history of the numerous butterflies belonging to the Riodinidæ. Lipteninæ may reasonably be considered to be lichen-feeders, but closer and more elaborate studies of them might lead to the discovery of some affinity between those and entomophagous butterflies. Of all the Poritinæ, the life history of only one species, if I remember rightly, has been known. This butterfly, *P. erycinoides* of Java, bears a trivial name suggestive of its relationship with erycinids (= Riodinidæ).

Now to end my address, I wish to make a proposal. You must already be aware, no doubt, of the content of my proposal. Yes, this influential society of international fame should now embark on researches into life history of moths and butterflies on a worldwide scale, and I believe that no other lepidopterological body in the world is so suited to take up this difficult but important task as the Lepidopterists' Society. Let us advance the *new frontiers* of lepidopterology by studying immature stages and hosts of those numerous butterflies and moths whose biologies remain unknown.

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