

LEPIDOPTERA

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The first N.Z. Lepidoptera to be described were two butterflies collected 200 years ago by Banks during the first **Endeavour** voyage. These were described by J. C. Fabricius in 1775 as **Papilio gonerilla** and **P. itea**. It is possible that the second voyage yielded "**Hesperia**" **salustius**, described by Fabricius in 1793 but given as from India, in the Drury Collection.

The next to be found was a day-flying moth collected by D'Urville's naturalists during the second **Astrolabe** voyage (1827-30), and described by Boisduval in 1835 as **Leptosoma annulatum**. The type is in Paris.

Between 1840 and 1880, collections were made both by visitors (Dieffenbach, **Erebus** and **Terror** expedition members, Hochstetter and other associates of the Austrian **Novara** expedition) and by settlers and colonial administrators (Messrs. Bolton, Churton, Colenso, Oxley in the North Island, P. Earl and Andrew Sinclair in both Islands). Later in this period, large collections from Otago (by F. W. Hutton), Canterbury and Marlborough (Fereday, Enys) and Westland (Helms) were sent to the British Museum, as were the Dieffenbach and Erebus and Terror collections. The **Novara** Lepidoptera were bought from Austria by Rothschild of Tring, and these also now reside in the British Museum; only a few species (some described by Guenee) are at Paris.

These early collections were variously worked on by Doubleday, Adam White, Butler, Guenee, Rogenhofer and the Felder brothers, and most extensively, by Walker. Some were lost on their way to the British Museum, including Buller's unique *Porina mairi*.

Only Fereday was far-sighted enough to keep what amounts to a paratype collection of species described by Butler and Guenee; this important collection is at present in the Canterbury Museum.

After 1880 and up to 1939, the study of N.Z. Lepidoptera was literally controlled by Edward Meyrick, aided by G. V. Hudson and Alfred Philpott. These three workers, with their descriptions, Hudson's colour illustrations and compilations, and Philpott's pioneer work on male genitalia, strigil and maxillary palpus structures have left a well-documented, well-illustrated basis on which to work. We are fortunate in having this basis, and fortunate that much of the Hudson and Philpott collections in N.Z. are paratype collections of the Meyrick type collection which is, of course, at the British Museum.

Several workers examined immature stages—Purdie, Chappell, Watt—and a few made specialist studies; especially important (and still today models of their kind) are the papers by M. N. Watt on leafmining Lepidoptera. Other workers described new species—Howes, Chappell, Watt again, Lindsay.

After 1939 (Meyrick died in 1938) overseas workers were re-arranging many families; these changes did not affect the New Zealand workers (Salmon, Howes) who continued up to 1956 to use, or at least not question, Palaearctic genera for the bulk of N.Z. moths. Since 1950 (and Hudson's death), work on N.Z. Lepidoptera has been confined either to popular books, e.g. Gaskin 1966, Salmon 1964, descriptions of new species (Salmon, Fox), and even aberrations (Salmon). Salmon and Bradley, and also Viette made useful contributions to our knowledge of subantarctic Lepidoptera. Gaskin, Viette, and latterly and most successfully, Dumbleton, have investigated systematics of the economically important Hepialidae.

Dugdale has examined larval characters in a group of Geometridae and adult and larval systematics of Tortricidae. Gibbs has discussed the systematics of one genus of Arctiidae, as has Wise for butterflies.

In all, some 1,400 species have been described from, and 83 species found introduced in New Zealand; our fauna is meagre compared with that of the world (ca 112,000) or Australia (11,200).

To evaluate past work fairly, one has to have regard for the mental climate and the resources of the times. The largely "Victorian" classification of Meyrick (and hence, Hudson) survived so long here because Philpott died too soon to force his genitalic studies to their logical conclusion; there was a certain degree of authoritarianism in the way the work of Watt and, indeed, of Phil-

pott, was interpreted by Meyrick and Hudson. Only lately have modern concepts of systematics been applied (Gibbs, Munroe, Dumbleton, Dugdale) and then only to minute fragments of the fauna, or to special regions—e.g. Campell Island.

All families are in need of extensive revision not only to bring them into line with overseas classifications but also to clear up internal problems. Such revisions are abetted (a) because active revisional work is going on in Australia and (b) by the good, well-illustrated state of our literature, and by the presence of paratype collections. Such revisions are hampered principally by the fact that at least 75% of our holotypes (including synonyms) are at the British Museum, and that New Zealand material was not included in J. F. Gates Clarke's monumental catalogue of Meyrick's Microlepidoptera.

Types are held in N.Z. at Auckland, Dominion and Canterbury Museums, and at Entomology Division, D.S.I.R., Nelson; one other type (technically "Australian") is at Canberra. These types are those of Philpott, Hudson, Watt, Howes, Salmon, Turner, Lindsay.

The N.Z. fauna is unbalanced, with many important groups absent (Castnoidea, Cossoidea, Bombycoidea, Eriocranioidea, Hesperoidea, Incurvarioidea, Notodontoidea, Zygaenoidea) or poorly represented (e.g. Geometroidea—one family out of a possible seven); imbalance is seen at all levels from superfamily to genus. For instance, within the tortricid subfamily Tortricinae, four out of a possible six tribes are present; of these tribes, one (Archipini) contains ten times as many species as the other three combined. Similar situations occur in the butterflies, in the Noctuidae (Hadeninae dominant, other subfamilies negligible), Geometridae (Geometrinae, endemic Sterrhinae absent) and can be presumed for the apparently less well understood "microlepidoptera."

The accompanying table indicates what families are being looked at, by whom, and where; out of 32 families, three are receiving intensive attention. The future needs of any revision are:

1. Access to types (most in the British Museum).
2. Complete descriptions and illustrations of genitalia and where possible, immature stages.
3. Comprehensive distributional, and host plant data.

The abundance of outlying islands of varying size, antiquity and distance from the two main islands, our complex climates, topography, floristics and geological history, our refinements in knowledge of geochronology and the rapid opening up of previously inaccessible areas make a study of our Lepidopterous fauna (despite its apparently depauperate state), a most satisfying subject. Information on distribution, host plants, mode of life (particularly in alpine, subnival and subantarctic zones) offers a most rewarding field for any number of workers—a plea made 86 years ago by Meyrick, and still valid today.

	Indig- enous	Intro- spp.	Latest Revisers (N.Z.)	Present Workers
Micropterygidae	..... 20		Hudson 1928, 1939	Gibbs (VUW), Pilgrim (UC)
Mnesarchaeidae	..... 6			
Hepialidae	..... 16		Dumbleton 1966	Dugdale (larvae; <i>Wisecana</i>)
Nepticulidae	..... 13		Watt 1921, Hudson l.c.	—
Gracillariidae	..... 16	3	Watt 1920, 1924, Hudson l.c.	Wise (AMu)
Lyonetidae	..... 29	2	Hudson l.c.	—
Psychidae ¹	..... 25			—
Tineidae	..... 56	7	Yano 1964	Dugdale (S only)
Tortricidae	ca. 140	6	Dugdale 1966 (pt)	Dugdale
Elachistidae	..... 12+		Salmon & Bradley (S)	Dugdale (S only)
Glyphipterygidae	..... 64	1	Hudson l.c.	(Arita (Japan))
Scythridae	..... 4			—
Yponomeutidae	..... 36	1	Salmon & Bradley (S)	Dugdale (S only)
Cosmopterygidae	..... 15	4		
Gelechiidae	..... 41	5		
Oecophoridae	..... 200	10	Hudson l.c.	Dugdale (S only)
Stenomidae	..... 1			
Tineageridae ²	..... 19	1		
Xyloryctidae	..... 2			
Carposinidae	..... 20		Hudson l.c.	
Copromorphidae	..... 3		Philpott 1929	Dugdale (S only)
Pterophoridae	..... 15		Hudson l.c.	
Pyalidae	..... 230	19	Hudson; Munro (pt)	Gaskin (Crambinae), Munroe (Scopari- inae) (C)
Thyrididae	..... 1		Hudson l.c.	—
Lycaenidae	..... 3	2	Wise 1968, Gibbs 1961	Gibbs (VUW); Wise (AMu); Flux (AED)
Nymphalidae	..... 5	2 ³		Flux (AED); Wise (AMu)
Pieridae	..... 1	1		—
Geometridae	..... 260	5	Hudson l.c.; Dugdale (pt)	Dugdale
Sphingidae	..... 2		Hudson l.c.	(Zimmermann (Ha) relevant)
Arctiidae	..... 4	1	Gibbs (1962 (pt)	—
Hypsidae	..... 1		Hudson l.s.	Dugdale (S only)
Noctuidae	ca. 150	8 ³		Fox (Ma); Goodwin (Li Ag); Dugdale (S only); ? Fletcher (BM)
<u>1407 + 83 = 1490 grand total</u>				

1: Includes "micro" Psychidae — *Taleporia*, *Mallobathra*, etc.

2: "Heliodinidae" of Meyrick.

3: Includes non-establishing (but recurrent) wanderers.

AED = Animal Ecology Division D.S.I.R.; AMu = Auckland Museum; BM = British Museum; C = Canada; Ha = Hawaii; Li Ag = Lincoln College Canterbury; Ma = Mania, Taranaki; UC = University of Canterbury; VU.W. = Victoria University, Wellington; S = Subantarctic Islands.