

PROFILES

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THE CLARKE/SHEPPARD/TURNER GENETIC COLLECTION OF BUTTERFLIES AT THE NATURAL HISTORY MUSEUM, LONDON

Additional key words: *Papilio*, *Hypolimnas*, *Heliconius*, mimicry.

This collection consists of 132 drawers of specimens from the investigations of genetics of Lepidoptera that the late P. M. Sheppard and I started about 40 years ago. This work deals with the genetics of a number of species and of particular importance has been a study of mimicry in swallowtail butterflies. In 1982, the collection was accepted for permanent storage by the British Museum (Natural History), now called the Natural History Museum. The collection is active, as my colleagues and I continue to expand on four decades of genetic research.

The butterflies in the drawers (ca. 5000 specimens total) are those paired in genetic crosses and their progeny. With them are explanations of the experiments, and locality maps. Alongside the cabinets are bound copies of the relevant reprints of papers published on these experiments. Also accompanying the collection is the early correspondence between P. M. Sheppard and me when the work was begun in the 1950s. To guide those interested in studying the collection, I have prepared a descriptive catalog: *Guide to the Clarke/Sheppard/Turner Genetic Collection of Butterflies*. Originally written in 1982, it was updated in 1987 (after J. R. G. Turner joined as collaborator in 1986), and most recently in October 1990 (3rd Updating). The *Guide* briefly describes the history of the collection and summarizes the experiments, by species, in chronological order. The *Guide* also contains a glossary of 40 genetic terms and an Appendix that discusses special aspects of genetic work on three moth species. A visitors' record book completes the collection.

SUMMARY OF THE COLLECTION

The sequence of the following list of species studied roughly corresponds to the order in which we did the work. There are approximately 40 specimens in each of the 132 drawers.

Main Collection: Butterflies

***Papilio machaon* group:** 6 drawers (#1-6); 21 reprints (1952-86). Includes *P. machaon*, *P. polyxenes (asterias)*, *P. machaon lapponicus*,

P. brevicauda, *P. hospiton*, *P. m. saharae*, *P. m. hippocrates*, *P. maackii*, *P. zelicaon*, and *P. rudkini*.

***Papilio glaucus* group and its close relatives:** 9 drawers (#7–15); 12 reprints (1955–91). Includes *P. glaucus*, *P. rutulus*, *P. eurymedon*, and *P. multicaudatus*.

***Papilio polytes* and its mimicry:** 11 drawers (#16–26); 2 reprints (1972). Includes hybrids with other species.

***Papilio dardanus* and its mimicry:** 32 drawers (#27–59); 21 reprints (1936–91). Includes relationships to *P. demodocus*, *P. constantinus*, *P. phorcas*, and *P. humbloti*.

***Papilio aegaeus*:** 2 drawers (#61–62); 1 reprint (1985).

***Hypolimnas bolina*:** 18 drawers (#63–80); 7 reprints (1975–89). Includes its status as a mimic and all female broods.

***Papilio memnon* and its mimicry:** 44 drawers (#81–124); 9 reprints (1967–82).

***Chilasa clytia*:** partial drawer (#125); 1 reprint (1967). Genetics of the two mimetic forms of the Sri Lankan subspecies *lankeswara*.

***Danaus plexippus*:** partial drawer (#125); 1 reprint (1980). Genetics of a new mutant.

***Danaus chrysippus*:** 1 drawer (#126); 1 reprint (1973). Genetics of crosses from Australia and Sierra Leone.

Appendix: Moths

***Biston betularia*:** 2 drawers (#127–128); 6 reprints (1976–90). A 29-year study of the frequency of form *carbonaria* in the Wirral.

***Lymantria dispar*:** 3 drawers (#129–131); 7 reprints (1980–91). A reassessment (with E. B. Ford) of the work of Goldschmidt; with suggestions regarding pest control in the USA.

***Panaxia dominula*:** 1 drawer (#132); 2 reprints (1990–91). Samples from the rediscovered colony on the Wirral Way.

A BRIEF HISTORY OF THE COLLECTION

In 1946, after the war, where I had spent in Australia the last of my six years in the Navy, my boyhood interest in breeding butterflies was reawakened, and I discovered the technique of hand-mating swallowtail butterflies, and thereby was able to breed *Papilio machaon*. In this species I first studied the brown/green pupal coloration in collaboration (by post) with Dr. J. P. Knudsen of Oglethorpe University, Georgia. In September 1952 he sent me some pupae of the black American Swallowtail *Papilio polyxenes (asterias)* and on 4 October I was successful in hand-mating a female to a *P. machaon* male, from Malta (*P. machaon gorganus*) and this led to the publication of our first paper "A hybrid

swallowtail" (Clarke, C. A. & J. P. Knudsen 1953, *Entomologist's Record and Journal of Variation* 65:76–80).

In October 1952 I was lucky enough to get in touch with a young (age 32) geneticist, Dr. P. M. Sheppard, who was working in E. B. Ford's department at the University of Oxford. He advertised for pupae of *machaon*, and in the early correspondence with him I mentioned that I had larvae of *polyxenes* × *machaon* cross, and sent him some eggs. He was keenly interested, and we arranged to meet at the Mitre Hotel in Oxford on 7 December 1952. This early correspondence with Philip Sheppard is with the collection.

We soon turned our attention to the study of mimicry in *Papilio glaucus* and *Papilio dardanus* and kept in touch over the breeding work, which was done at my home near Liverpool. In 1956 Philip came to Liverpool as senior lecturer in genetics (later becoming professor) and subsequently we worked together both on butterflies and on Man until his death in 1976. The story of the research is outlined in the biographical memoir (1977) I wrote for him for the Royal Society, of which copies are both with the letters and with our joint reprints (Sir Cyril Clarke 1977, Philip Macdonald Sheppard 1921–1976, *Biographical Memoirs of Fellows of the Royal Society* 23:465–499).

In 1974, two years before he died, Philip was awarded the Royal Society's Darwin Medal. This is given biennially for work of acknowledged distinction in the broad area of biology in which Charles Darwin worked, notably in evolution and population biology. Sixteen years later (1990) I was awarded the Royal Society's Buchanan medal "in recognition of distinguished original research in the broad area of medical sciences". In my case this was in the prevention of Rh haemolytic disease of the newborn, and arose from a study of butterfly genetics, particularly of *Papilio memnon*.

In 1986 Dr. John R. G. Turner, then aged 45, and Reader in Evolutionary Genetics at Leeds University (later, 1987, Professor) agreed to collaborate in the running and future care of the collection, which is now known as the *Clarke/Sheppard/Turner Genetic Collection of Butterflies*. John, with his knowledge of butterfly genetics, his Liverpool background, and his training by E. B. Ford, was an admirable choice for continuing the important genetic experiments documented by this collection. It is our intention that, over the next few years, the three and a half thousand *Heliconius* (chiefly *melpomene* and *erato*) bred by Sheppard and Turner, in collaboration with K. S. Brown Jr., W. W. Benson, and others, will be added to the collection.

Much of the work documented by the collection was made possible by generous grants from the Nuffield Foundation to the University of Liverpool, where most of the breeding was done. Transfer of the col-

lection to the Natural History Museum in 1982 (then called the BMNH) was supported by an Emeritus Fellowship from the Leverhulme Trust to Sir Cyril Clarke.

USE OF THE COLLECTION

The collection can be visited by application to Mr. R. I. Vane-Wright (direct line 071 938 9341) or Mr. Phillip Ackery (direct line 071 938 9346) both in the Department of Entomology at the Natural History Museum, and I am often in London and could probably meet anyone interested there (home telephone 051 625 8811). Mrs. Alison Gill goes to the NHM frequently to act as curator of this collection; she can be reached at her address: Tideway, The Warren, Mapledurham, Near Reading, RG4 7TQ (telephone 0734 479 126). A limited number of copies of the *Guide* are available to interested researchers in exchange for postage.

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