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HISTORY OF ENTOMOLOGICAL STUDIES IN THE BAHAMAS

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ABSTRACT

As part of the effort to establish a Bahamian National Insect Collection, I undertook a survey of previously-collected Bahamian insect species. This survey was conducted by: 1) requesting information from members of the Entomological Society of America, 2) reviewing previous literature on Bahamian Entomology, and 3) searching for Bahamian insects currently held by major museum collections.

In this paper, I shall report on contributions to studies of Bahamian insects made by institutions and individuals since the late 19th century. I shall also present a preliminary report on the holdings of Bahamian specimens in various collections.

INTRODUCTION

There is a misconception among modern entomologists (*e.g.* Anderson 1996) that the insect fauna of the Bahama Islands has been neglected. In fact there have been many insect studies throughout the Bahamas since the last decade of the 19th century, and description of Bahamian insects goes back still further to the visit of the artist-naturalist, Mark Catesby, in 1725. Among those who followed in Catesby's footsteps to study insects in the Bahamas were a number of prominent insect taxonomists, amateur naturalists, and others, including a future British Prime Minister and the private secretary to a British Royal Governor.

It is true, however, that Bahamian insect specimens are currently widely scattered at a number of museums and educational institutions in Britain and throughout North America, and there has been no attempt to catalog them into a single list. There are currently four small insect

collections in the Bahamas, one of them private, the other three at public institutions.

As part of an attempt to help the government establish a Bahamian National Insect Collection in Nassau, the author along with Drs. David and Sherilyn Smith has been engaged in searching the literature and museum collections for Bahamian collection records. The preliminary results of the search are described in this paper.

EIGHTEENTH CENTURY – MARK CATESBY

Mark Catesby was the first naturalist to visit the Bahama Islands expressly for the purpose of studying their natural history. During his visit to North America between 1722 and 1726, Catesby traveled to the Bahamas in 1725 as a guest of the royal governor Charles Phinney. Besides New Providence (then Providence), he was able to visit Andros, Abaco, and Eleuthera. His resulting work (Catesby 1731) was devoted primarily to drawings of birds and plants from Virginia, Carolina and Florida, and while in the Bahamas, he concentrated his efforts on its marine fishes. The work contains several disclaimers about the lack of attention he paid to insects. In the preface he noted that

“... as there is a greater variety of the feathered kind...and as they excel in the beauty of their colors, and have a nearer relation to the plants of which they feed on and frequent, I was induced ... to complete an account of them rather than to describe promiscuously the insects and other animals”
(Catesby 1731).

Elsewhere in the preface he noted that while he had drawn and described some of the

more common insects (primarily butterflies and moths) from mainland North America, he had made no attempt to document the insect diversity he saw in the tropics. Still, he reported one incident involving insects encountered in the Bahamas.

In December of 1725, while he was guest of Governor Phinney, he saw the governor examining his feet after an outing. The governor's primary concern was that he might be infected with the flea called a Chego, which Catesby named *Pulex minimus cutem penetrans* (now *Tunga penetrans*), the females of which were known to embed under the skin, become engorged with eggs and cause infection (Belding 1965). While examining his feet with a hand lens, the governor discovered a small beetle. Catesby's drawing of the beetle made with magnification (Figure 1a) was published in the appendix of the 1731 edition of the Natural History of Carolina, Florida and the Bahama Islands, and is thus the first illustration of an

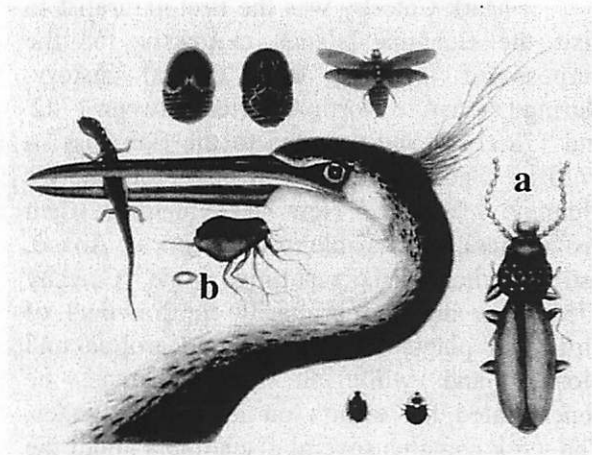


Figure 1. The first illustration of an insect from the Bahamas in Plate #10 from the Appendix to Volume II, of Mark Catesby's *The Natural History of Carolina, Florida and the Bahama Islands*. The beetle designated "a" was discovered as the Royal Governor examined his foot with a hand lens for fleas, and was named *Scarabaeus capricornis minimus cutem penetrans* by Catesby. Catesby called the flea designated "b" *Pulex minimus cutem penetrans*. Used by permission of the John Carter Brown Library at Brown University.

insect specifically reported from the Bahamas. The flea was also pictured on the same plate (Figure 1b), but Catesby did not clearly indicate whether the specimen drawn was also from the Bahamas. This incident was also noted by Catesby (1996).

LATE NINETEENTH CENTURY

In the last decade of the nineteenth century, a number of British and American naturalists visited the Bahamas. C. J. Maynard, a Massachusetts resident, pursued his studies on Bahamian natural history between the late 1880s and the early twentieth century. According to Gillis *et al.* (1975), many of Maynard's Bahamian studies were reported in his own privately published journals: *Contributions to Science*, published at irregular intervals between 1889 and 1896, and *Record of Walks and Talks with Nature*, (1908 to 1920). Maynard's scientific pursuits were varied, but his description of the Bahamian subspecies of the gulf fritillary butterfly, now known as *Agraulis vanillae insularis* Maynard is of interest to entomologists.

In the first half of 1890, the Americans John and Alice Northrup visited the Bahamas. John Northrup, a newly appointed member of the faculty at Columbia University, was primarily interested in collecting marine invertebrates for the University's collection; the Northrups also collected numerous plant specimens. They stayed on New Providence from January until mid-March when they sailed to Andros, where they remained until early July. In her record of their Bahamian research, published after Mr. Northrup's death, Mrs. Northrup listed "a number of centipedes, spiders, beetles, moths and butterflies" among the specimens they carried back to New York (Northrup 1910).

Also in 1890, young Neville Chamberlain arrived in the Bahamas where he would remain until 1893 as the manager of his father's sisal plantation on North Andros. He devoted much of his spare time in the Bahamas to studying natural history and collecting butterflies, and his biographer, David Dilks (1984), attributes these experiences with engendering Chamberlain's lifelong interest in

nature. Chamberlain's Bahamian specimens were donated to the British Museum. Among the specimens was the type for the endemic Bahamian butterfly eventually named for him, *Eurema chamberlaini* Butler. The type locality of the species was originally thought to be Andros, since Chamberlain had spent most of his time in the Bahamas there (Munroe 1950). However, the species does not occur on Andros; the types are now thought to have come from New Providence where Chamberlain also collected (Smith *et al.* 1994). From this confusion, we may infer that Mr. Chamberlain's collection labels provided incomplete locality data!

In 1893, an expedition of scientists from the University of Iowa visited the Bahamas. Although H. F. Wickham, the party's entomologist, collected primarily Coleoptera, he also collected specimens of 23 species of Hymenoptera while on Eleuthera (Ashmead 1896).

During the year 1898, J. L. Bonhote served as personal secretary to Governor Gilbert Carter on New Providence. Aside from his duties, Mr. Bonhote found time to pursue his interests in entomology, collecting a number of butterflies on New Providence, as well as the moths that came to lights in the gardens of the Government House. His specimens, donated to the British Museum, were the basis for several publications on Bahamian insects, notably that on the butterflies published in 1900 by Emily Mary Sharpe and a second publication on the moths published in 1901 by Sir George Hampson. Miss Sharpe's paper included the description of a new species of swallowtail butterfly, *Papilio bonhotei* Sharpe, now known as *Heracles andraemon bonhotei*, the Bahama swallowtail.

EARLY TWENTIETH CENTURY

In 1904 an expedition from the American Museum of Natural History visited the islands of New Providence and Andros. The primary object of this expedition was study and collection of flamingoes by Frank M. Chapman. However, the museum's ant specialist, William Morton Wheeler also accompanied Chapman on the expedition, and he was able to collect ants

extensively on both islands. Wheeler's (1905) publication listed 56 species of Bahamian ants including ten new species. He also collected Orthoptera (Rehn 1906) and arachnids (Banks 1906). The same year, Thomas Barbour, Glover Allen and Owen Bryant collected insects on New Providence, North Andros and Mangrove Cay. They collected a total of 96 species of Diptera (Johnson 1908).

The Carnegie Museum of Natural History in Pittsburgh sent the first of its Bahamian collectors to the Islands in 1908. W.W. Worthington visited several islands including New Providence, Acklins, Great Inagua and Watlings Island (San Salvador) between 1908 and 1909. His specimens are in the collections of the Carnegie Museum.

Two successive expeditions from the Museum of Comparative Zoology at Harvard visited the islands in 1933 and 1934 aboard the ship Utawana. Dr. Thomas Barbour returned to the Bahamas for these expeditions, along with Dr. David Fairchild and Mr. and Mrs. James Greenway. Some of the insects they collected were described in publications on butterflies (Bates 1934), ants (Wheeler 1934) and wasps (Bequaert 1948, Bradley 1964). Islands visited included Grand Bahama, Eleuthera, Watlings, Cat, Crooked, Conception, Mayaguana and Great Inagua.

THE 1950's - THE AMERICAN MUSEUM OF NATURAL HISTORY

In 1947, the American Museum of Natural History opened a biological field station on North Bimini. The station provided an opportunity for entomologists from the museum to collect extensively on North, South and East Bimini. In 1951 collections were made by Drs. Mont Cazier, Frederick Rindge, Willis Gertsch, Charles Vaurie and Mrs. Patricia Vaurie. Every day that weather permitted, the entomologists were transported by boat to South or East Bimini where collections were done by hand during the morning and evening hours. After four months in 1951, they had collected 109,718 specimens (Vaurie 1952b). Most of these specimens are in the American Museum of Natural History. The specimens were examined by a number of taxonomic authorities, and 21 publications on

the Bimini collections soon appeared (Arnett 1953, Barber 1953, 1954, Cazier 1951, 1952, Cazier and Lacey 1952, Curran 1953, Darlington 1953, James 1953, Krombein 1953, Metcalf 1954, Park 1954, Philip 1957, Rindge 1952, Ruckes 1952a, 1952b, Smith 1954, Strohecker 1953, Valentine, 1955, Vaurie 1952a, Young 1953). Many of the papers contained descriptions of new taxa, including a total of sixty new species. In only a few cases had the authors had examined and included information about previously collected Bahamian species (e.g. Krombein 1953).

Vaurie's (1952b) paper had promised that a survey of all the Bahamian islands would soon follow the Bimini studies, and in December 1952, the Van Voast Expedition to the Bahamas was launched. Aboard the sailing ship *White Wing*, piloted by its owner, Horace Van Voast Jr. of Schenectady New York, were three young naturalists, Ellis B. Hayden Jr., Leonard Giovanelli and George B. Rabb, who were charged with collecting animals in all taxa. During their expedition, which lasted until May 1953, they visited all the major Bahamian islands and cays as well as the Turks and Caicos. The specimens they collected totaled 48,500 insects and arachnids, 2106 reptiles, 684 amphibians and 67 mammals (Rabb and Hayden 1957). Collected so soon after the Bimini collections, the insect specimens from the Van Voast Expedition received less attention from taxonomists. Three papers dealt with both Bimini and Van Voast material (Blocker 1971, Selander and Bouseman 1960, Wirth 1956). Only seven papers described the Van Voast insect collections exclusively (Barber and Ashlock 1960, Dodge 1965, Martin 1957, Rindge 1955, Snyder 1958, Westfall 1960, Young 1963). Only 23 new species were described from these specimens. In fact, many of the specimens remain in *pro tem* at the American Museum of Natural History nearly half a century later (personal observation).

LATE TWENTIETH CENTURY

The staff of the Carnegie Museum of Natural History continued their Bahamian collecting efforts that had been started by Worthington in the early years of the century.

Harry K. Clench, a lepidopterist, was responsible for much of their collecting in the 1970's. Mr. Clench's first two papers on Bahamian butterflies had appeared in 1941 when he was sixteen years old (Brown 1980); there followed two more papers on the Bahamas, one each in 1942 and '43. Throughout his career Mr. Clench published 129 papers (Brown 1980) on butterflies from localities throughout the world; in the 1970's he resumed collecting in the Bahamas including Andros (Clench 1977a) and Great and Little Inagua (Clench and Bjorndal 1980).

In 1976, Mr. Clench was a member of the Carnegie Museum Bahamas Expedition, the primary purpose of which was to search for the over wintering sites of the Kirtland's warbler. Besides Dr. Mary Clench, the primary ornithologist, expedition members included Mr. Clench, the botanist Dr. William T. Gillis, and Arthur Bianculli, a herpetologist. Between 26 February and 4 April, 1976, the expedition visited the following islands: North and South Andros and Green Cay off Andros, Little Farmers' Cay, Great Guana Cay and Great Exuma in the Exumas, Rum Cay, Great and Little Inagua, West Plana Cay, Acklins and Crooked Island, Long island, Conception, Cat Island, Little San Salvador, Eleuthera, Man of War Cay, Powell's Cay and Great Abaco in the Abacos, and New Providence (Clench 1977b). Mr. Clench reported collecting 1003 specimens on the expedition. Most of the material collected throughout his career remains in the Carnegie Museum. Taxonomists at the Carnegie Museum continue their interest in insects of the Caribbean under the direction of John Rawlins (Rawlins, pers. comm).

Following Mr. Clench's death in 1979, studies of Bahamian butterflies were continued by Lee D. Miller, Mark Simon and D. J. Harvey, who are still active in the field. Their 1992 paper, for example, describes collections on Crooked, Acklins and Mayaguana made throughout the 1980s. Dr. Lee Miller and Dr. Jacqueline Miller are curators at the Allyn Museum of Natural History in Sarasota, where most of these specimens are deposited. With D. S. Smith, the Millers are coauthors of *The Butterflies of the West Indies and South Florida* (1994), an important reference work that

incorporates a number of recent changes in taxonomy.

In the 1980s two private collectors concentrated their efforts on individual islands of the Bahamas. Dr. Timothy McCabe collected at Simons Point on Great Exuma during the months of December and January in 1980-81 and 1981-82, as well as in April 1986. While primarily interested in noctuid moths, he made a comprehensive collection of all insect groups. His list of Noctuidae from Great Exuma includes 119 species (McCabe unpub.). These specimens are part of his private collection. Between 1984 and 1994 the Wiley family ran light traps at Rainbow Bay, Eleuthera. These specimens are in the Florida State Collection of Arthropods.

In the 1990s several authors utilized studies of insects in the Bahamas as a means of testing hypotheses related to MacArthur and Wilson's (1967) Theory of Island Biogeography (e.g. Browne *et al.* 1993, Morrison 1998). Elliott and Elliott (1994, 1996) made comparisons of wasp populations on island groups with different geologic history. Other studies concentrated on the role of insects as pollinators of Bahamian plants (e.g. Rathcke *et al.* 1996, Rathcke *et al.* 2001a and b).

In the mid-1990s, as part of a biodiversity study in the Bahamas, faculty and students from the College of the Bahamas, in cooperation with scientists from the Canadian Museum of Nature, conducted natural history surveys at Pigeon Cay, off North Andros (Johnson *et al.* 1994). A list of beetles collected from this survey was subsequently published (Anderson 1996).

INSECT COLLECTIONS CURRENTLY IN THE BAHAMAS

Denis Knowles of Nassau, New Providence, who has had a long-standing interest in Lepidoptera (e.g. Knowles and Smith 1996), has an extensive private collection of butterflies started in the 1940s. He has recently donated some of the duplicates to the Bahamian National Insect Collection.

Started in 1970, the Bahamian Field Station has provided a site for biological research on San Salvador. The station has a teaching insect collection of approximately 6000

specimens. The nucleus of the collection came from specimens collected by students from Hartwick College between 1975 and 1981 (Elliott *et al.* 1978, Elliott *et al.* 1980, Elliott 1993). Several recent workers have added to the collection. This work has included that on various fly taxa by Dr. Aubrey Scarbrough and his students (Scarbrough and Rutkaus 1983, Scarbrough and Davidson 1983), Dr. Mark Deyrup's work on the ants of San Salvador and other islands of the Bahamas (Deyrup 1997, Deyrup *et al.* 1998), studies by Drs. David and Sherilyn Smith on the island's aquatic insects, primarily dragonflies and damselflies (Smith and Smith 1994, 1996), and insect visitors to the island's mangroves and other shrubs collected by Drs. Lee B. Kass and Beverly Rathcke (e.g. Rathcke *et al.* 1996, Rathcke *et al.* 2001a and b).

Dr. D. J. MacDonald lived on Grand Bahama in the 1980s after his retirement from Dartmouth University. His specimens were donated to the Rand Nature Centre after he left the island because of ill health. The collection of approximately one thousand specimens is at the Nature Centre and has been curated and cataloged by Dr. Carmen Trisler of Wittenberg University.

In 2000, in cooperation with the Bahamian Department of Agriculture, the author and Drs. David and Sherilyn Smith began surveys of insects on the islands with the objective of starting a national insect collection for the Bahamas. The collection, currently containing approximately 5,000 specimens, is maintained at the Botanic Garden in Nassau.

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Danforth, John Carter Brown Library at Brown University, provided me with the photograph used in Figure 1. Dr. Carmen Trisler, Wittenberg University, provided information about D. J. MacDonald and the insect collection at the Rand Nature Centre.

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