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THE BUTTERFLIES OF MONTSERRAT, WEST INDIES

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The West Indian island of Montserrat lies near the northern end of the young inner-chain volcanic Lesser Antilles, at 16° 45' N latitude and 60° 15' W longitude. The island is roughly like a ham in shape and lies about 50 km southeast of St. Christopher-Nevis and 64 km northwest of Guadeloupe, as well as 43 km southwest of Antigua; of these three adjacent islands, St. Christopher-Nevis and Guadeloupe are inner-chain islands and Antigua belongs to the old outer chain. Montserrat has a maximum length of 18 km and a maximum breadth of 11 km — a total area of about 200 km^2. There are three major mountain ridges: Silver Hill in the north (maximum elevation 393 m), Central Hill in the middle of the island (762 m), and the Soufrière Hills in the south (916 m). The mean maximum temperature is 30° C and the mean minimum temperature is 23° C. The annual rainfall is about 140 cm, with a range of 102 cm to 178 cm. The central part of the west coast receives more rain than the east coast, and the north and south are generally dry. The incidence of rain is extremely variable, but the rainiest months are usually between September and November, and the dry season usually from December to June (data from Anonymous, 1960:32).

The butterflies of Montserrat are poorly known. Since the island lies in a rather strategic position zoogeographically and has a variety of habtats, its lepidopteran fauna is potentially interesting. Hall (1936) gave an annotated list of butterflies of St. Christopher (= St. Kitts), which, despite its smaller size than Montserrat, has a relatively large butterfly fauna. Pinchon and Enrico (1969), although concentrating on the rhopalocerans of the Antilles Françaises, gave a summary table (pp. 34-37), island by island, of the butterflies known from all the Lesser Antilles, including Montserrat. They noted (p. 33) that in December 1967 that they had themselves collected for two days on Montserrat and had secured 97 butterflies representing 26 species. Their table includes not only their own records but those from other sources. A total of 29 species

was reported, representing the families Danaidae, Nymphalidae, Heliconiidae, Lycaenidae, Pieridae, Papilionidae, and Hesperiidae. Trinominals were, in many cases, omitted by Pinchon and Enrico. Riley (1975) likewise discussed the Lesser Antillean butterfly fauna in his field guide. Taking into consideration that in some cases he specifically mentioned the island of Montserrat and in others merely gave the range of a particular species as "throughout the Lesser Antilles," it is somewhat difficult to be certain what species (and subspecies, which he did indeed list and characterize in the distributions of each species) occur on Montserrat. His total is 26 species putatively reported from Montserrat. Several records, obviously, from Pinchon and Enrico, were overlooked (or perhaps discarded as dubious).

In June 1980, Sandra L. and Peter L. Richel, the latter a previous student of the senior author, moved to Montserrat from the United States so that Mr. Richel could attend medical school there. He volunteered to make butterfly collections throughout the year in his spare time. He encouraged another student, Geoffrey L. Blatt, to collect also; between the time of his arrival and February 1981, he has sent 330 specimens of butterflies for our study. Although Mr. Richel will be on Montserrat for many more months, his collection thus far contains so many interesting specimens and new records for the island that it seems an appropriate time to publish the data.

We have drawn on his field notes whenever possible; all material is with precise locality and approximate elevational data (see list below). Almost all specimens are in the collection of the senior author, but a few have been deposited in the collection of William W. Sommer. We doubt that the list of Montserrat butterflies is as yet complete; there are several species which occur on St. Christopher or Guadeloupe which are certainly expected on Montserrat but remain as yet uncollected (see Discussion).

To avoid repetition in the species accounts, the reader should be aware that we have used the authors' names only in the following publications: Hall (1936), Comstock (1944), Pinchon and Enrico (1969), Brown and Heineman (1972), and Riley (1975). All other citations are given in the customary manner.

COLLECTING SITES

The following list of collecting sites is arranged from north to south and west to east, by parishes (Fig. 1). Elevations are approximate and taken from the 1:25,000 contour map of Montserrat published and copyright in 1978 by the British Government's Ministry of Overseas Development (Directorate of Overseas Surveys). Dates (all in 1980) of collections are given for each locality, and a brief description of each is likewise given. Most localities are on the western (leeward) versant of the island.

1) St. Peter: Woodlands, 107 m; in semi-dense "bush;" 25.x, 28.x.

2) St. Peter: Frith Village (including Salem, Fleming Village, Hope Village); 153 m - 229 m; about dwellings, in gardens, and in semi-dense "bush;" 26.vi, 3.viii, 9.viii, 30.viii, 21.ix, 25.ix, 28.ix, 12.x.

3) St. Peter: Aymer's Ghaut, 0.4 km N Frith, 107 m; among thick "bush" in area of running water; 12.x.

4) St. Anthony: Kinsale Village, Aymer's Ghaut, 61 m; in low grass in ghaut. 4.ix.

5) St. Anthony: Spring Ghaut, 458 m; in semi-dense "bush" after 1 week of heavy rains. 21.vi.

6) St. Anthony: Iles Bay Estate, 8 m; around Kingswood House at Belham River and third hole of golf course; area grassy; 6.x, 11.x, 13.x, 16.x, 20.x, 23.x, 26.x, 13.xi, 22.xi.

7) St. Anthony: Cork Hill, 61 m; at Belham River; 12.xi.

8) St. Anthony: Amersham Estate, 244 - 350 m; along road crossing two large pastures and in low bushes; 18.x, 20.x.

9) St. Anthony: Fairfield, 122 m; in grazing fields; 4.ix.

10) St. Anthony: Broderick's Estate, 214 m; in low thorny bushes; 4.ix.

11) St. Anthony: Spring Estate, 275 - 610 m, including base of Chance's Peak in fields of low grass and semi-dense "bush;" 4.x.

12) St. Anthony: Spring Estate, 366 m; in low bushy fields; 4.ix.

13) St. George's: Tuitt's Village (including White's Ghaut), 153 m; in bushes in residential area; low grasses and flowers in fields, dense "bush," and shrubs; 19.x, 1.xi, 11.xi, 12.xi, 3.xii.

14) St. George's: Dyer's Village, 229 m; in high grass with flowers; 11.x.

DANAIDAE

Danaus plexippus leucogyne Butler 1884

Localities: 1, 6, 8, 11, 14

Perhaps the best way to approach the systematics of Antillean *D. plexippus* is to examine the interpretations of subspecies historically, with emphasis on the Lesser Antilles. Comstock noted that *D. p. plexippus*, the continental subspecies, "definitely occurs in its typical form in Porto Rico. However, the Antillean populations undergo some modification and in Porto Rico and the Virgin Islands this is considerable." He then proceeded to consider the two previous citations for the nominate form by Wolcott (1936, 1941) under *D. p. plexippus,* although he suspected that the second citation actually applied to *D. p. portoricensis* (Comstock had not examined the material involved). Comstock regarded all Puerto Rico material as *D. p. portoricensis* Clark. Virgin Islands specimens were regarded as *D. p. leucogyne* Butler (type-locality St. Thomas) and also assigned to this subspecies was a pale female (taken 26 August) from St. Christopher. He postulated that a Lesser Antillean invasion came from the south, and that specimens from Martinique, Dominica, and Guadeloupe "resemble *megalippe* from northern South America. Some specimens follow the *portoricensis* pattern, but in fresh specimens the white scales following the veins on the underside of the hindwings can be seen." His conclusions were that "*portoricensis* is associated more closely with *plexippus* from the north, and *leucogyne* more closely with *megalippe* from the south."

Pinchon and Enrico accepted three subspecies: *D. p. plexippus* in North and Central America, and on Martinique; *D. p. megalippe* Hübner on the Antilles and South America north of the Amazon, absent from Martinique but present in Haiti (= Hispaniola) and Dominica in the Lesser Antilles; *D. p. erippus* Cramer in South America from south of the Amazon to Patagonia. They considered (p. 71) *D. p. portoricensis* and *D. p. tobagi* Clark individual variations of *D. p. megalippe.* They did not mention *D. p. leucogyne.*

Brown and Heineman, in addition to *D. p. plexippus* on the mainland, recognized (p. 89) *D. p. tobagi* from Tobago, *D. p. leucogyne* from the Virgin Islands and St. Christopher, and *D. p. portoricensis* from Puerto Rico. Elsewhere in the West Indies they either stated or implied, occurs *D. p. megalippe.*

Riley summarized the Antillean distributions of the subspecies as follows: *D. p. plexippus* - Bahamas and Cuba; *D. p. megalippe* - Hispaniola, Puerto Rico, Jamaica, Cayman Islands, Lesser Antilles, but *D. p. plexippus* "overlaps" the sedentary subspecies (*megalippe*); (*D. p. megalippe* has also been reported from Great Inagua in the southern Bahamas by Clench and Bjorndal, 1980); *D. p. portoricensis* - Puerto Rico; and female form *leucogyne* in the Lesser Antilles.

It is obvious from the above summaries that the taxonomy of Antillean monarchs is in a state of flux; this is surely not helped by the fact that the northern mainland continental subspecies is migratory and thus winter-collected specimens are suspect. The characteristics used to separate all the subspecies from each other are often relative and non-quantitative. Brown and Heineman even went so far as to suggest that *D. p. plexippus* (which is migratory) is a species sibling to the sedentary Antillean populations, since "there are minor but constant differences in the male genitalia, and there is the marked difference in the shape and proportions of the forewing and the shape of the light-colored subapical spots on that wing."

We have examined four males and four females from Montserrat, taken between 4.x and 25.x at elevations between 8 m and 458 m. The species seems to be uncommon on the island; Hall noted that it was common on St. Christopher. Since Comstock

recorded a St. Christopher specimen as *D. p. leucogyne* (Hall used no trinomial), and since Pinchon and Enrico considered Martinique material *D. p. plexippus,* it is pertinent to examine our specimens in comparison with these and other possibilities.

By combining the information on differentiation of the subspecies given by Comstock and Brown and Heineman, as well as by using the photographs in Comstock, the following points may be made. *Danaus p. portoricensis* is smaller than *D. p. plexippus* (fw length averaging about 44 mm in *portoricensis,* 52 mm in *plexippus*), *portoricensis* is bright buff on the unhw in contrast to dull buff in *plexippus.* The borders and vein-outlining are velvety black in *portoricensis,* not slight brownish as in *plexippus*; the black scaling on the veins is not edged with white scales except in an occasional specimen. The double row of white spots in the marginal border (characteristic of *plexippus*) tend to drop out, sometimes completely in *portoricensis.* On the apex of the fw of *portoricensis* the double pair of spots distad of the cell are usually white, and the first (basad) pair is usually absent or obsolete. *Danaus p. leucogyne* on the other hand has, in males, the two pairs of subapical spots present, sometimes pale tawny but usually white. The white spots in the black borders are usually obsolete, sometimes absent. Topotypical female *leucogyne* have a pale ground color (dusky cream-color). In both sexes, the white scaling along the black vein-outlining on the unhw is absent, or there are traces only.

Danaus p. megalippe is characterized by a much less produced apex than the fw of *plexippus.* In *megalippe,* the subapical spots are pink-fulvous (as they are in *plexippus* also) but are not elongate. The paired series of light spots in the black outer margin of the fw are white in *megalippe,* whereas in *plexippus* the outer row is white and the inner row tawny. In *megalippe,* of the two rows of white spots in the black margin of the hw, the outer row is large and well developed whereas the inner row is quite variable and in Jamaican specimens the inner row is often obsolescent, except at the two ends of the row. The major difference between *megalippe* and *portoricensis* is that in the former the two pairs of apical spots are present, but in *portoricensis* the inner pair is usually absent of obsolete. Finally, Brown and Heineman noted that *portoricensis* differs from all other subspecies by the markedly yellow coloration of the unhw.

We have compared our short series of Montserrat *D. plexippus* with a long series of *D. p. megalippe* from Hispaniola and one specimen from Jamaica, as well as seven specimens of *D. p. portoricensis.* In both these samples, the presence or absence of the basad pair of apical spots is variable (for example, the spots are present in 3, absent or very small in 4 *portoricensis*). The white spots in the hw marginal black band are variable in Hispaniolan and Puerto Rican material but do agree in that usually the outer row is more or less complete whereas the inner row is often represented only by its two extremes. In fact, two Puerto Rican specimens (one male, one female) have the hw marginal black band virtually immaculate; the female has the subapical spots present on the fw, the male lacks them. The supposed yellow unhw in *portoricensis* does not differ to our eyes from the color of the unhw in Hispaniolan material.

The eight Montserrat specimens combine these characteristics in different ways. All have the two pairs of subapical fw spots present, large, buffy in three of four males and three of four females, white or very pale buffy in the balance of the specimens. The white dots in the hw marginal band vary in that even the outer row may be absent or obsolescent, whereas the inner row is reduced to its two extremes or represented by dull buffy and almost indistinguishable blurs. The unhw are the same "yellow" as are those of *megalippe* and *portoricensis.* Although none of the specimens is well-flown, females are paler dorsally than are males. There is no white edging to the black veins on the unhw.

Comparisons of the above data suggest that Montserrat *D. plexippus* do not agree with Brown and Heineman's or Riley's diagnoses of *megalippe,* the subspecies "expected" on the Lesser Antilles. Nor are they *D. p. plexippus* (as Pinchon and Enrico's Martinique record might suggest) nor *D. p. portoricensis* (as might be the case because of the proximity of Montserrat to Puerto Rico). Rather, they agree excellently with Comstock's definition of *D. p. leucogyne* (which, it may be recalled, Brown and

Heineman recognized as a valid form, Comstock recorded from adjacent St. Christopher, but Riley considered only a female form of *D. p. megalippe*), and we so call them. The situation within the Lesser Antilles as a whole is far from solved. We are inclined to agree with the statement of Brown and Heineman (p. 89) that "We believe that in time each major island and each closely knit group of smaller islands will be shown to harbor its own distinctive form of the Monarch."

Specimens: 8

APATURIDAE

Anaea minor Hall 1936

Localities: 3, 6, 13

Anaea minor, described from St. Christopher, has since been recorded only from Antigua (Riley) and St.-Barthélémy (Pinchon and Enrico), although the latter specimens apparently are somewhat larger and thus more comparable to *A. borinquenalis* Johnson and Comstock from Puerto Rico. The Montserrat specimens are the first record for the species from the island. They agree in size and description with *A. minor* and do not approach the size of Puerto Rican *A. borinquenalis.* Elevational data range between 8 m and 153 m, and thus the butterfly seems to occur (somewhat locally, judging from the few locality records) at lower elevations. The dates of capture vary between 11.x and 3.xii. Pinchon and Enrico noted the abundance of *Anaea* on St.-Barthélémy in December, where they collected more than 70 specimens in three days; they assumed that they were present at a time of eclosion, since on a visit to the same island in July and August of the same year they did not see even one individual. They also noted that on Antigua, there was a relative abundance in November and February. It would thus appear that this species emerges from October to February, with a peak in November and December.

Specimens: 15

NYMPHALIDAE

Junonia evarete michaelesi Munroe 1951

Localities: 2, 6, 9, 11

Junonia e. michaelesi occurs throughout the Lesser Antilles; it is a much more common butterfly than the few specimens examined indicate. Elevations range between 8 m and 279 m and dates between 26.vii and 26.x. The junior author reported (unpubl. MS.) on a series of 35 specimens of *J. e. michaelesi* from Dominica; he noted that the fw length of the Dominica material was smaller (21 - 27 mm; x = 24.8 mm) than those of 13 specimens of the same subspecies from Puerto Rico (26 - 32 mm; x = 28.4 mm). Montserrat specimens are comparable to those from Dominica in size (22 - 27 mm; x = 25.3 mm). Members of Lesser Antillean populations of *J. e. michaelesi* are much smaller in size than Puerto Rican specimens with almost no overlap between the extremes. That this is not a sample artifact is shown by Comstock's fw measurement of Puerto Rican specimens of "about 28 mm."

Specimens: 7

Anartia jatrophae jatrophae Johansson 1763

Localities: 2, 3, 4, 6

This species is common and widespread at lower elevations (8 m - 229 m). Dates of collection vary between 26.vi and 16.x. Most specimens are from (2); the butterflies do not shun human habitations and their flowers. Jimenez (MS) collected and saw only two *A. j. jatrophae* in June 1980 on Dominica at sea level. This suggests that there may be several broods, one of which occurs in the July-October period, during which this species is most abundant on Montserrat. The series includes four specimens that are much more richly pigmented (brownish gray) than the others, which are extremely pale.

Specimens: 18

Biblis hyperia Cramer 1782

Localities: 1, 3, 5, 6, 7, 13

This species occurs throughout the Lesser Antilles from St. Eustatius in the north, south to St. Lucia (but excepting Martinique), the Virgin Islands, Puerto Rico, and Hispaniola. Montserrat material was collected between 21.vi and 12.xi and at elevations between 8 m and 458 m (locality 5). It is one of the few butterflies known from such a high elevation on Montserrat.

Specimens: 26

Antillea pelops pelops Drury 1773

This species has been known, in the Lesser Antilles, only from St. Christopher, the type-locality. The present specimens are the first record of this tiny nymphalid from Montserrat. Dates of collection are between 6.x and 25.x. Judging from our experience on Hispaniola, *A. pelops* is extremely local but very abundant where it is found. Because of its small size, it is often overlooked, and it is probable that it occurs on other Lesser Antillean islands besides St. Christopher and Montserrat. At locality (6) it was associated with grassy areas, but at (1) it was associated with semi-dense "bush." On Hispaniola, this species is associated with both grassy and bushy or shrubby areas, much as those described for Montserrat. The same subspecies occurs on the Lesser Antilles, Puerto Rico, and Hispaniola, but superficially the Montserrat specimens are distinctly paler (less bright orange) than are those from Hispaniola. Hall noted that on St. Christopher this species was "generally distributed in the island, but always singly in isolated specimens" and Pinchon and Enrico commented that *A. pelops* is somewhat rare on St. Christopher and always with isolated individuals. At least Hall's collecting was done in December; in our experience on Hispaniola, this species is much more abundant in the summer.

Specimens: 11

Vanessa cardui Linnaeus 1758

Localities: 2, 6, 11

Although *V. cardui* is known from throughout the West Indies and specifically in the Lesser Antilles from St. Lucia, Dominica, Martinique, and Barbados, these are the first specimens from Montserrat. Riley noted that *V. cardui* is migratory and that it is "liable to occur almost anywhere." This comment, as well as a similar one made by Pinchon and Enrico concerning the occurrence of *V. cardui* on Martinique, suggest that *V. cardui* is of sporadic and chance occurrence in the Antilles in general. This is surely not the case on Hispaniola, where there are obviously breeding populations of both *V. cardui* and *V. virginiensis* Drury. The Montserrat specimens were collected between 4.x and 23.x, and at elevations between 8 m and 610 m. This species occurs at higher elevations on Montserrat but also may be found almost at sea level. All specimens are somewhat worn, one (taken 23.x) especially so. This wear, however, does not affirm that *V. cardui* is transitory or a vagrant, since elsewhere in the Antilles it is a summer butterfly, and one might expect some wear by the end of the year.

Specimens: 5

HELICONIIDAE

Heliconius charitonius punctatus Hall 1936

Localities: 1, 2, 6, 13

Heliconius c. punctatus is widely distributed on Montserrat and is much more common than the number of specimens suggests. Elevations range between 8 m and 153 m, and the butterflies are primarily at low elevations. Dates for our specimens are between 12.x and 11.xi.

Riley noted that two subspecies of *H. charitonius* overlap on Montserrat: *charitonius* Linnaeus and *punctatus*. All of our specimens are clearly referrable to the latter subspecies, and we suggest that there is no overlap between the two subspecies.

Hall, when describing *H. ch. punctatus* from St. Christopher, examined "a long series" of specimens. He stated that the presence of a yellow spot in "cellule 3 of the forewings" varies from "a mere dot to a maximum length of 8 mm. and breadth of 2 mm., and is only absent in one out of nearly a hundred specimens." Our material agrees completely with this statement; the yellow accessory spot is always present, although it may be very small. It may also be pertinent to note that although *H. charitonius* is widespread in the West Indies, its Lesser Antillean range stops at Montserrat and thus the St. Christopher-Montserrat population is the southern terminal one in the islands. We see no reason to postulate an overlap of two subspecies on Montserrat and consider *H. c. punctatus* an especially well marked subspecies occurring at least on St. Christopher and Montserrat. Pinchon and Enrico (p. 79) noted the occurrence of the species on Antigua, Saba, and St. Eustatius; we would expect that *H. c. punctatus* is the subspecies at least on Saba and St. Eustatius.

Specimens: 13

Dryas iulia warneri Hall 1936

Localities: 1, 6, 11, 13

Dryas i. warneri occurs in both the lowlands and uplands at elevations between 8 m and 458 m. Dates vary between 4.x and 3.xii; Richel did not encounter the species prior to the first date noted. Our series consists of 11 males and 3 females.

The taxonomic status of Montserrat *Dryas* is confused, due primarily to the fact that the name *warneri* Hall (type-locality St. Christopher) has had a checkered history. Riley distinguished *D. i. warneri* as large and broad-winged "with the forewing dark apical area separated from the outer margin by a tapering fulvous band that reaches to vein 4 [= M_3] in the male, less far in the female." He further compared *D. i. dominicana* Hall (type-locality Dominica) with *D. i. warneri* and stated that the two were similar in shape and extent of the upperside markings, but that these markings in the former are "more sharply defined and more intensely black." Pinchon and Enrico had made basically the same statement characterising *D. i. warneri* but noted that they had collected one specimen on Saba that was "practically identical" with specimens of *D. i. dominicana* from Guadeloupe, to which island they had extended the range of the subspecies. They also have colored photographs (of rather good quality except that the colors are somewhat too bright) of a pair of *D. i. dominicana* from Dominica, a pair of the same subspecies from Guadeloupe (including an underside view of a Guadeloupe male), and the same from Saba.

Brown and Heineman considered *warneri* a synonym of *D. i. iulia* from Puerto Rico and the Virgin Islands (type-locality St. Croix). Emsley (1963) accepted *warneri* as a valid subspecies but examined no specimens. To summarize the above, *warneri* has been 1) accepted as a valid subspecies, 2) considered a synonym of more southern *dominicana*, and 3) considered a synonym of more northern *iulia*.

Clench (1975) noted for the first time that the subspecies of *D. iulia* could be arranged into two major groups, an Antillean group and a Continental group, on the basis of the color of the costal area of the *female* uphw. In the former, this area is nearly as dark as the balance of the hw color, whereas in the latter it is pale and contrasting, as it is in males of all subspecies. He examined no female *warneri* but considered that this taxon belongs to the Antillean group (costal area not pale), nor did Clench see any female *dominicana* (but these latter were examined for him and were found to have pale costal areas and thus pertained to the Continental group). Thus, the transition between the two groups occurs within the Lesser Antilles, just to the south of Montserrat.

Montserrat females do not have pale costal hw areas and thus differ from *D. i. dominicana* but pertain, as Clench correctly suspected, to the Antillean group of the species; synonymy of *warneri* with *dominicana* seems unwarranted.

Alternatively, synonymy of *warneri* with *iulia* is untenable. Male *warneri* are much more heavily marked along the fw margin than male *iulia*, the dark margin broader and more heavily dentate; the transverse dark subapical line is broader in *iulia* and not narrowed toward the outer margin as it is in *warneri*. The net result of this

configuration is a more or less uniformly broad subapical bar in *iulia* and a broad dark subapical bar that narrows abruptly toward the outer margin in *warneri*. In female *warneri*, the dark grayish brown bar the parallels or arches over the inner margin of the fw, is strongly contrasting with dusky ground color and is about 1.5 times as broad as it is in *iulia*. This bar is complete in *warneri* to the outer margin, but it is much less complete (fading toward the outer margin) and much less conspicuous (paler) in *iulia*. Accordingly, we consider *D. i. warneri* a valid subspecies that occurs at least on St. Christopher and Montserrat.

There remains the anomaly of Pinchon and Enrico's identification of the Saba male as *dominicana*. The photograph of this individual (Pl. 14) shows a constricted subapical bar and a heavy black and dentate marginal band. We suspect that the Saba population should likewise be assigned to *D. i. warneri*.

Specimens: 14

Dione vanillae insularis Maynard 1889

Localities: 1, 2, 6, 13

This species is a common lowland butterfly, occurring between elevations of 8 m and 153 m. Collection dates are from 28.ix to 11.xi. It is much more common than the few specimens indicate. Riley noted that *D. v. vanillae* and *D. v. insularis* meet on Dominica, St. Lucia, and Martinique, where they intergrade to some extent but also maintain a degree of independence. All specimens from Montserrat are assigned to *D. v. insularis*.

Specimens: 5

LYCAENIDAE

Chlorostrymon simaethis simaethis Drury 1773

Locality: 8

Two specimens were taken at elevations of 244 m and 350 m on 18.x and 20.x respectively. Although the species is widespread in the Lesser Antilles, extending from St. Christopher in the north to Grenada in the south, it has not been previously reported from Montserrat (Pinchon and Enrico).

Specimens: 2

Strymon acis acis Drury 1773

Locality: 11

The single specimen of this species was taken on 4.x at an elevation of 275 m.

Specimen: 1

Strymon bubastus ponce Comstock and Huntington 1943

Localities: 1, 2, 6, 11, 13

This species is relatively common and widely distributed from elevations of 8 m to 275 m. Dates of capture range from 21.ix to 1.xi. It has been previously reported from Montserrat (Pinchon and Enrico).

Specimens: 8

Electrostrymon angerona Godman and Salvin 1896

Localities: 1, 2, 5, 6, 11, 13

This is the most common hairstreak on Montserrat. It occurs between elevations of 8 m and 458 m, although most specimens are from lower elevations. Dates vary between 21.vi and 3.xii with the largest number of specimens from October.

Specimens: 18

Leptotes cassius chadwicki Comstock and Huntington 1943

Localities: 2, 6, 8, 13

This species appears to be the less common of the two blues on Montserrat. Its elevational range is from 8 m to 244 m and dates are from 26.vii to 3.xii.

Although *L. cassius* has been reported from Montserrat previously, no one has assigned the population there to subspecies. Our six specimens are all females. There are two possibilities: 1) *L. c. catilina* Fabricius from the Virgin Islands, and 2) *L. c. chadwicki* Comstock and Huntington from Guadeloupe, Dominica, St. Lucia, and Martinique (Riley; Pinchon and Enrico). In *L. c. catilina* females, "the upperside is dusky with the markings so suffused with brown as to be obscured in some specimens. The hindwings are much darker, so that the pattern is submerged. White scaling is reduced to traces and blue scaling is much less evident. On the underside, the brown pattern is fully developed, with much less white showing" (Comstock). Pinchon and Enrico gave a detailed description of *chadwicki*, and Riley stated that *chadwicki* is the darkest "race". Our specimens agree more with *L. c. chadwicki* to the south rather than with *L. c. catilina* to the north, although males might change our interpretation. In general, our females are darker than *L. c. theonus* from Hispaniola and Florida, but many specimens (including four from Montserrat) are worn or well-flown. We are not impressed with the differences between the subspecies.

Specimens: 6

Hemiargus hanno watsoni Comstock and Huntington 1943

Localities: 2, 4, 5, 6, 8, 9, 11

This species is much more common than *L. cassius* and is widely distributed altitudinally from 8 m to 610 m. Dates are between 21.vi and 18.x.

Specimens: 14

PIERIDAE

Ascia monuste virginia Godart 1819

Localities: 3, 5, 6, 9

This species is widespread, from elevations of 8 m to 458 m. Dates range from 21.vi to 12.x. The specimens agree well with *A. m. virginia.*

Specimens: 8

Appias drusilla comstocki Dillon 1947

Localities: 1, 8, 11, 13

Appias drusilla is somewhat less common than *A. monuste*, but it is widely distributed at moderate to high elevations (107 m to 610 m). Dates range between 4.x and 3.xii.

The subspecific status of Lesser Antillean *Appias drusilla* is puzzling. Riley listed from these islands the subspecies *boydi* Comstock (St. Lucia), *cosmtocki* Dillon (Dominica), and *monomorpha* Hall (Grenada). Pinchon and Enrico considered Guadeloupe specimens *boydi* and added Martinique to Dominica for *comstocki.* In addition to these islands, *A. drusilla* is known from Saba, St. Christopher, and Montserrat. Hall called St. Christopher specimens *A. d. poeyi* Butler, a subspecies otherwise known from Cuba and the Cayman Islands.

The Montserrat specimens are few; three are males which are white above. The two females have wide black borders on the fw, and the uphw is creamy yellow. Both the subspecies *boydi* and *poeyi* have, in the "wet season" females all or part of the fw cell dark gray to black. *Appias d. comstocki* has the female upfw black border 2.5 mm wide at the apex, thence 1 mm and irregular to the anal angle. Males have the underside glossy dull cream on the hw and at the fw apex. Our specimens agree very well with this description. The Guadeloupe record of *boydi* noted above we regard as dubious; unless one has the proper sex and the proper seasonal form, the Antillean subspecies of *A. drusilla* are distinguished with difficulty. It seems likely that *A. d. comstocki* occurs on the Lesser Antilles from Saba to St. Lucia.

Specimens: 5

Eurema leuce antillarum Hall 1936

Locality: 6

This is the first record of this species from Montserrat; our three specimens were taken at an elevation of 8 m and on 13.xi and 22.xi. To the north, *Eurema l. antillarum* is known from St.-Martin and St. Christopher, and to the south from Guadeloupe, Dominica, and St. Lucia.

Specimens: 3

Eurema venusta emanona Dillon 1947

Localities: 1, 3, 6, 9, 11, 13

This small *Eurema* is widely distributed from 8 m to 275 m, and specimens have been collected between 4.ix and 3.xii. Riley gave Guadeloupe as the northernmost island where *E. v. emanona* occurs, but Pinchon and Enrico included Montserrat. All specimens have pale yellow (rather than white) hw.

Specimens: 10

Eurema elathea Cramer 1775

Localities: 7, 13

This is the first record of this species on Montserrat. It has been recorded previously from Antigua and St. Christopher to the north, and from Guadeloupe to the south (Pinchon and Enrico; Hall). The specimens were taken at elevations of 61 m and 153 m on 12.xi. None was seen previous to this date. All specimens are fresh and unflown. Pinchon and Enrico encountered this species in December on St.-Barthélémy and in August on St.-Martin. Hall found *E. elathea* abundant on St. Christopher in December. This suggests that this species is at least double brooded, in August and December.

Specimens: 6

Eurema lisa euterpe Ménétriés 1832

Localities: 2, 3, 4, 6, 9, 11, 12

This species is widespread, from elevations of 8 m to 366 m. Dates range from 26.vii to 30.x. There are numerous records of capture of *E. l. euterpe* in Puerto Rico and the Virgin Islands throughout the year (Comstock).

Specimens: 26

Anteos maerula Fabricius 1775

Locality: 6

This species is widespread in the Greater Antilles (Riley). There is also a breeding population on Guadeloupe (Pinchon and Enrico), but until now this species was not known from Montserrat. The single specimen was collected on 22.xi at an elevation of 8 m. Since the butterfly was fresh and unflown, it may indicate that there is a resident population on Montserrat. Our individual may be a vagrant, however, from Guadeloupe, the only place *A. maerula* is known to breed and its previous only record in the Lesser Antilles.

Specimen: 1

Phoebis sennae sennae Linnaeus 1758

Localities: 2, 3, 6, 8, 12, 13

This species is widely distributed from elevations of 8 m to 366 m, and specimens have been collected between 9.viii and 11.xi. *Phoebis s. sennae* is considered abundant throughout the islands and throughout the year (Riley). Forewing lengths of Montserrat males vary between 32 mm and 35 mm ($x = 33.3$ mm; $N = 8$), females between 25 mm and 34 mm ($x = 29.9$ mm; $N = 4$). Dominican males (Jimenez, MS) vary between 21 mm and 30 mm ($x = 28.6$; $N = 20$), females between 29 mm and 32 mm ($x = 29.5$; $N = 6$). Hispaniolan males vary between 32 mm and 37 mm ($x = 34.2$ mm; $N = 25$), females between 32 mm and 37 mm ($x = 34.8$; $N = 11$).

Riley stated that this species has two cell-end spots of equal size on unhw. Although Comstock stated "The underside maculation is often obsolete," comparing specimens from the Lesser Antilles with those from Hispaniola, we have observed that those from Hispaniola agree with Riley's statement, but those from Montserrat and Dominica vary quite strikingly.

Only eight of 19 specimens examined from Dominica have two spots, 10 have only one spot, and one has no spots (Jimenez, unpubl. MS). Four of the 12 specimens from Montserrat have only one spot, the remainder have two.

Specimens: 12

(Phoebis trite watsoni Brown 1929)

This species has been reported from Montserrat by Pinchon and Enrico and Riley. Both publications commented on this species being a fast high flyer, chiefly favoring tree tops. We have no specimens from Montserrat.)

PAPILIONIDAE

Battus polydamas neodamas Lucas 1852

Locality: 13

Although Pinchon and Enrico noted in their table that *B. polydamas* occurs on Montserrat, neither there nor in their text did they comment on the subspecies involved or further mention the locality. Their symbol in the table indicates that they neither examined specimens of nor collected this species. Montserrat is located between islands which harbor three subspecies: *antiquus* Rothschild and Jordan on Antigua, *christopheranus* Hall on St. Christopher, and *neodamas* Lucas on Guadeloupe. The first of these is presumed to be extinct and is known only from an illustration published in 1770 (Riley). Riley defined *B. p. neodamas* as "forewing band reduced to five small spots, those above vein 4 being lost; hindwing band typically narrow. On the underside the spots of the forewing postdiscal band alost white, reduced to five, small and narrow; hindwing very dark, red markings rather small, white marginal markings very delicate and inconspicuous, no transverse bar from inner margin." Our material agrees very well with this definition. The three small apical spots on the upfw are absent in all but one specimen, in which two of them are very faintly indicated. The underside markings agree in color and size with *neodamas* as well. The major discrepancy is that the uphw grayish green band is not narrow but rather is wide, especially at the costal and (somewhat less so) inner margins. Pinchon and Enrico (Pl. 1) showed (in black and white) photographs of topotypical *B. p. neodamas*, and our material agrees with Guadeloupean specimens (but not that from Marie-Galante). It might well be that with a longer series, the Montserrat butterflies could be differentiated from those from Guadeloupe and from St. Christopher as well. *Battus polydamas* is noteworthy for the number of subspecies (13) it has evolved in the West Indies, with eight of these in the Lesser Antilles.

Battus p. neodamas is common locally on Montserrat. All specimens have come from the same general area (Tuitt's Village and nearby White's Ghaut) at an elevation of 153 m. Dates of capture vary between 1.xi and 3.xii. None was encountered before the early date, and none was seen elsewhere on the island. The localization of *B. polydamas* on Montserrat is reminiscent of the same phenomenon in southern Florida with the Bahamian subspecies *lucayus* Rothschild and Jordan. It is possible that, in both cases, these are relatively recent arrivals which have become established but which have not as yet had the opportunity to expand their ranges more broadly. It is interesting that the well-marked subspecies *dominicus* Rothschild and Jordan on Dominica was encountered only near Portsmouth in June 1980 by the junior author, and that Pinchon and Enrico also saw this species near Portsmouth during two years (1965 and 1966) collecting there. Considering that *B. p. dominicus* is a well defined subspecies, it hardly seems likely that it, too, is a recent arrival, but its distribution

seems quite limited. On Guadeloupe, Pinchon and Enrico noted that the species is abundant enough and widely distributed, but they mentioned only one (montane) locality for its capture (Sofaîa). However, they also mentioned the species foraging on the flowers of *Ipomoea pes-caprae*, a littoral member of the Convolvulaceae, so at least on Guadeloupe the species has a broad altitudinal distribution.

Specimens: 10

HESPERIIDAE

Epargyreus zestos zestos Geyer 1832

Localities: 1, 8, 11

This species was encountered at elevations between 107 m and 458 m. The specimens were collected between 4.x and 25.x. Hall reported only two specimens from St. Christopher in December. Pinchon and Enrico found this species abundant on Martinique during April and May, but uncommon at other times of the year. This species is apparently uncommon on Montserrat.

Specimens: 3

Polygonus leo savigny Latreille 1824

Localities: 1, 5, 6

Both species of *Polygonus* (see beyond) seem to be uncommon on Montserrat. This species has been taken at elevations between 8 m and 468 m; dates vary between 21.vi and 25.x.

Polygonus l. savigny is known from the Bahamas, Cuba, the Virgin Islands, St. Christopher, and Montserrat (Riley); although not listed in the distribution, data under "Early Stages" indicate that Puerto Rico should be included also. There are other subspecies on Jamaica (*hagar* Evans) and on Hispaniola (*lividus* Hübner). In addition, *P. l. savigny* occurs in southern Florida (Klots, 1951:205). The interposition of *P. l. lividus* on Hispaniola, "within" the range of *P. l. savigny* is most peculiar; the Hispaniolan subspecies is truly distinctive. Brown and Heineman summarized the situation well: ". . . the geography of the species and its forms is anomalous." They further commented that "material from the Lesser Antilles probably represents an unrecognized subspecies." To these statements we can add little, since we have such limited Montserrat material. However, comparison of our short series with five specimens from St. Martin and two from Puerto Rico indicates that the former agree in details with Montserrat material, whereas Puerto Rican specimens show a much higher blue gloss, and the hyaline spot in M_3-Cu_1 is much larger than in Lesser Antillean specimens. Pinchon and Enrico did not record *P. leo* from the Lesser Antilles; they considered all *Polygonus* from that area *P. manueli punctus* Bell and Comstock. They felt (p. 126) that *P. leo* was restricted to the Greater Antilles and *P. manueli* to the Lesser Antilles. Such is not the case.

Specimens: 3

Polygonus manueli punctus Bell and Comstock 1948

Localities: 1, 13

Like *P. leo*, this species seems to be uncommon on Montserrat. Occurrences are from elevations between 107 and 153 m, and specimens were collected between 25.x and 3.xii.

Although this taxon has not been previously reported from Montserrat, it has been recorded from St. Christopher to the north and Guadeloupe to the south, so it is expected. We have already commented on Pinchon and Enrico's assessment of the Lesser Antillean *Polygonus*, and their Montserrat "record" may apply to this species or *P. leo*.

Our three specimens agree excellently with Riley's description of *P. m. punctus*: the black subbasal spot on the unhw is lacking or very small (in contrast to large and prominent in *P. leo*), the inner dark band on the unhw is most prominent at the costa

(weakest there in *P. leo*), and the ground color between the bands in hw Cu_2-2A is distinctly ochraceous. In fact, the unhw ground color as a whole is yellowish-brown in *P. m. punctus*, in distinction to that of *P. leo* where the unhw ground color is grayish-tan with a distinct purplish sheen.

The two *Polygonus* apparently overlap broadly in altitude and are syntopic at (1). It is perhaps pertinent that *P. leo* has been taken at a much higher elevation (458 m) than has *P. manueli* (153 m) on Montserrat.

Specimens: 3

Urbanus proteus domingo Linnaeus 1758

Localities: 6, 8, 11, 14

This species is widespread throughout the entire West Indies. On Montserrat its elevational range is from 8 m to 458 m, and collection dates are from 4.x to 18.x. This skipper is much more abundant than our few records indicate. Hall found *U. proteus* moderately common during December on St. Christopher, and Pinchon and Enrico reported it as abundant during the entire year on Martinique.

Specimens: 4

Urbanus obscurus Hewitson 1867

Localities: 1, 2, 3, 6, 10, 11, 13

This species is common on the Lesser Antilles. On Montserrat it has been taken from 8 m to 458 m; collection dates are from 9.viii to 3.xii.

Specimens: 18

Achlyodes papinianus minor Comstock 1944

Locality: 13

This species seems to be uncommon on Montserrat. Only two specimens have been taken at an elevation of 153 m on 11.xi. These are the first specimens from Montserrat, although the species is known from the south (Dominica, Guadeloupe) and north (Puerto Rico, Virgin Islands). Riley apparently overlooked the record from Guadeloupe, from which two male paratypes were designated (Comstock). Pinchon and Enrico regarded the species as rare; they reported only one specimen from Guadeloupe (26.ix.1965) and two from Dominica (30.xii.1966). The dates suggest that there is a winter brood, probably in addition to at least one other (summer?) brood.

Comstock diagnosed *A. p. minor* by its smaller size (fw length 21.3 - 24 mm in males, 22.6 - 24.7 in females) and the color which is "slightly warmer brown in contrast with the markings as in *papinianus*." Additionally, on the upfw of both sexes "there is the pale, subcostal, hook-shaped mark, characteristic of *papinianus*." In *A. p. minor* "this mark is not drawn out to such an extended point and is usually bluntly rounded toward the apex and seldom extended by a line."

Brown and Heineman, while discussing Jamaican *A. mithridates* Fabricius (which Riley regarded as a subspecies of *A. papinianus*), stated that they considered Hispaniolan *A. p. sagra* Evans one end of a cline and *A. p. minor* the other.

We are unable to distinguish between *sagra* and *minor*, but it should be kept in mind that we have a long series of *sagra* and only two *minor*. In series, the larger size of *sagra* is obvious, but the extremes of *sagra* embrace the measurements of our two *minor*. In addition, the presumed pattern difference on the upfw noted above is undetectable to our eyes, perhaps in part due to the very dark ground color and slight contrast with the paler dorsal markings. We tend to agree with Brown and Heineman's assessment of the two subspecies but recognize that our sample of *A. p. minor* is very small and that we do not have topotypes from Dominica. We retain the Lesser Antillean trinomen pending the examination of additional material from the Lesser Antilles.

Specimens: 2

Pyrgus oileus oileus Linnaeus 1767

Localities: 1, 2, 3, 5, 6, 9, 12

This species has been taken from elevations of 8 m to 458 m, and the dates range from 21.vi to 25.x. *Pyrgus o. oileus* has been found as far south as Guadeloupe (Comstock), but *P. o. orcus* Stoll occurs in the West Indies as a second subspecies which has a distribution from Dominica southward in the Lesser Antilles (Comstock).

Brown and Heineman suggested that these may well be two separate species, since they occur sympatrically in Costa Rica and on Grenada. These two "subspecies" are distinguished by the presence of a narrow dark brown spot about 2 mm long on the middle of the costa of the unhw. This spot is lacking in *P. o. orcus* (Riley). Three of our specimens show a distinct tendency toward *P. o. orcus* by a reduction in this hw marking, and one of these agrees with Riley's description of *P. o. orcus* by lacking this distinguishing marking entirely.

Specimens: 11

Wallengrenia ophites Mabille 1878

Localities: 1, 2, 7, 8, 11, 13, 14

This species is widespread in the Lesser Antilles. It has been reported from Montserrat (as *W. otho ophites*) by Pinchon and Enrico. On Montserrat its elevational range is from 61 m to 458 m and dates of collection are from 26.vii to 3.xii.

Specimens: 13

Hylephila phyleus phyleus Drury 1773

Localities: 7, 13

This species is usually common throughout the entire West Indies. On Montserrat elevations range from 61 m to 153 m and the collection dates are from 19.x to 12.xi.

Specimens: 7

Calpodes ethlius Stoll 1782

Localities: 2, 6, 13

This is the first record of this species on Montserrat. It has been recorded previously from St. Christopher to the north but not from Guadeloupe to the south. The specimens were taken at elevations of 8 m to 229 m, and the dates range from 9.viii to 12.xi.

Specimens: 7

Panoquina sylvicola woodruffi Watson 1937

Localities: 1, 2, 3

Panoquina sylvicola is widespread throughout the Antilles and has been reported from Montserrat by Pinchon and Enrico. Specimens from Puerto Rico southward throughout the Lesser Antilles are referred to the subspecies *woodruffi* Watson, but Riley noted that individuals with the characteristics of *woodruffi* occur in the Cayman Islands, Jamaica, Haiti, and St. Christopher. Comstock used the trinomen without comment for Puerto Rican material and noted that "specimens from . . . various islands of the Lesser Antilles seem closer to *woodruffi* than to *sylvicola*." Riley's summary statement is that *woodruffi* "would seem to be a recurrent variety rather than a true subspecies." Pinchon and Enrico accepted *woodruffi* without comment. Brown and Heineman included Jamaica in the range of *P. s. woodruffi* and attributed the occurrence of both subspecies on the Cayman Islands to the (possibly) more recent introduction of *P. s. sylvicola*, the less common of the two forms. Certainly none of our Montserrat specimens has the prominent pale blue unhw band shown in Riley's Pl. 24, Fig. 10, which illustrates a Cuban specimens (= *P. s. sylviocla*). We are not convinced that *woodruffi* is a recognizable taxon and use the trinomen with misgivings. It seems likely that Riley's analysis is correct.

On Montserrat, *P. s. woodruffi* is apparently rather uncommon. It has been taken at elevations between 107 m and 153 m and thus is a lowland species. Dates of collection are between 28.ix and 25.x. At least on Hispaniola, this is a very common

summer species, even at high elevations, but is much less so in the winter. Thus its apparent rarity on Montserrat may be due to the season of the sample.

Specimens: 7

(Nyctelius nyctelius nyctelius Latreille 1824)

This species has been reported from Montserrat by Pinchon and Enrico, but they considered it uncommon everywhere in the Lesser Antilles. Riley stated that it is found "throughout the West Indies and generally common." We have no specimens from Montserrat. We use the above trinomen advisedly, since a distinct subspecies (*agari* Dillon) has been named from Dominica, and it may well be that this is the subspecies on Montserrat. Pinchon and Enrico did not assign Lesser Antillean material to either subspecies.)

DISCUSSION

The present paper discusses 38 species of butterflies that are known from Montserrat; we have examined material of 36 of these. It is instructive to compare the Montserrat butterfly fauna with that to the north on St. Christopher and to the south on Guadeloupe, both of which have been studied (Hall; Pinchon and Enrico). Despite the smaller size of St. Christopher on one hand and the much larger size of Guadeloupe on the other, the number of species (38) on each of them is identical with that on Montserrat. Yet the component species are not identical.

Species that are known from St. Christopher and not from Guadeloupe are: *Antillea pelops, Anaea minor, Heliconius charitonius, Strymon acis, Hemiargus thomasi, Polygonus manueli,* and *Calpodes ethlius.* Of these, all but one (*H. thomasi*) are known from Montserrat. Species that are known from Guadeloupe and not from St. Christopher are: *Historis odius, Allosmaitia piplea, Anteos maerula, Proteides mercurius, Astraptes anaphus, Achlyodes papinianus,* and *Ephyriades brunnea.* Of these, five (*H. odius, A. piplea, P. mercurius, A. anaphus, E. brunnea*) are unknown from Montserrat. Three other species (*Marpesia petreus, Hypolimnas misippus, Eurema daira*) are known from both St. Christopher and Guadeloupe but remain uncollected on Montserrat. Thus, there are potentially nine more species which can be expected to occur on Montserrat; if present there, the total of Montserrat Rhopalocera would be 47, higher than that of any other Lesser Antillean island.

The Montserrat butterfly fauna can be shown to have a northern and a southern element, each with 11 species, whereas 16 species are so widespread in the West Indies that to postulate their Montserrat origin is impossible. We categorize a species as northern or southern in origin by the occurrence in either of these directions of the main "body" of the Antillean range of the species or by the fact that a northern or southern subspecies of an otherwise (perhaps) widespread species occurs on Montserrat. The northern element consists of *D. plexippus, A. minor, J. evarete, A. pelops, H. charitonius, D. iulia, D. vanillae, S. bubastus, P. leo, P. oileus,* and *P. sylvicola.* The southern element includes *A. jatrophae, S. acis, L. cassius, A. drusilla, E. venusta, E. leuce, A. maerula, B. polydamas, P. manueli, U. obscurus,* and *A. papinianus.* The remainder are widely distributed species: *B. hyperia, V. cardui, Ch. simaethis, E. angerona, H. hanno, A. monuste, E. lisa, E. elathea, P. sennae, P. trite, E. zestos, U. proteus, W. ophites, H. phyleus, C. ethlius,* and *N. nyctelius.* If our interpretation is correct, then Montserrat stands at the crossroads of a Greater and a Lesser Antillean butterfly fauna.

One other point merits attention. Hall commented that on St. Christopher, as on Dominica and Grenada, "the primeval forests of the higher mountains in the Lesser Antilles have no peculiar butterflies at all, since collecting in the cool, wind-swept altitudes above 1200 ft. yielded nothing but species which are found in much greater abundance at lower elevations." The same seems to be true of Montserrat, where even at elevations above 1200 ft. (366 m) no unique or local high-elevation species were

encountered. Higher elevations yielded only fewer specimens of species that are more abundant at lower elevations and in disturbed situations.

It may be instructive to compare the number of species of Rhopalocera on Montserrat with the numbers on two other islands whose faunas have been recently studied. We admit at the outset that neither of these two other islands (Great Inagua in the southeastern Bahama Islands; Grand Cayman) is comparable in geographical setting (*i.e.*, does not lie within a longitudinally aligned archipelago as does Montserrat) nor is either of them at all mountainous. Yet both do have a variety of habitats and ecologies; both are generally more xeric than Montserrat. Grand Cayman has an area of about 256 km^2 and is more isolated than Montserrat, lying about 200 km south of Cuba and the same distance east-northeast of Jamaica; but it is affiliated faunistically as well as zoogeographically with two of the islands of the Greater Antilles. Askew (1980) listed 34 species of butterflies. Thus, Grand Cayman, with a slightly larger area and without the elevational or rainfall advantages of Montserrat, has a slightly smaller fauna; however, this difference in number of species in this case would be changed dramatically if the nine species expected on Montserrat are taken there, thereby raising the total to 47.

Clench and Bjorndal (1980) surveyed the butterflies of Great Inagua, an island in the southeastern Bahamas, about 80 km off the north coast of Hispaniola and part of the extensive Bahamian Archipelago. Great Inagua has an area of 1500 km^2 and thus is about seven times the size of Montserrat. They recorded 34 species from this island, of which two may not be established. In both cases, then, the butterfly fauna of Montserrat is greater than either of these more-or-less comparable islands that lie in quite different areas (as far as adjacent land masses, elevation, and rainfall are concerned).

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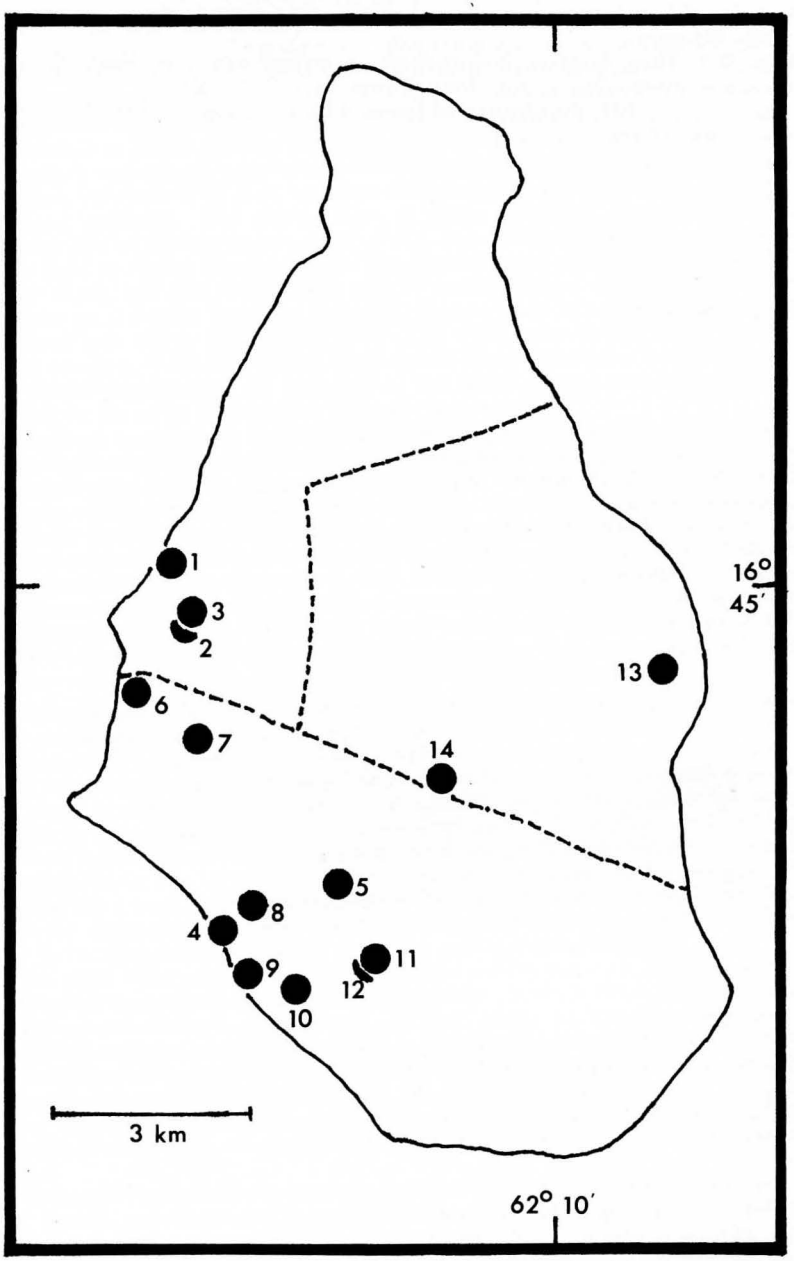

Fig. 1. Map of Montserrat, showing localities where collections have been made; code numbers refer to the text (see Collecting Sites).

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