

## NOTES ON BUTTERFLY MIGRATIONS IN THE PENINSULA OF YUCATAN

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Ever since I first began working on the fauna of the Yucatán peninsula, I have been aware of certain years conspicuous for migrations of butterflies and certain other insects. I herewith present a few notes on these observations.

As is well known, the vegetation of certain areas in the Neotropical region is determined not entirely by the average amount of rainfall over many years, but also the ability of that vegetation to resist certain dry- and wet-year periods. Therefore, in some places we might even find a comparatively raqitic flora which could be richer if unvariable yearly rainfall were present. But, as is the case, we find certain dry-year periods which tend to limit the development of the flora. These same dry- and wet-year periods appear to control the populations and relative abundance of many butterflies and other insects as well.

It is now apparent to me that most butterfly migrations occur here, at least in this peninsula, during these wet-year periods. The first year I noticed such migrations was in 1954. After having compared this year with 1955-56-57 and early 1958, I am of the opinion that it was a very wet year, and probably the tail end of a succession of wet-years. During May and June of that year, two great migrations were noticed. The first occurred about the 14th to the 16th of May following a torrential downpour quite abnormal for that month. I had just returned to Chichén-Itzá from Uayémá, Yuc., where we had attended a fiesta. This migration consisted of just about everything imaginable, all flying at tree- and house-top level from south to north. Upon climbing up on the roof of my aunt's house, now pretty high up and at a good level with the branches of some tall trees immediately behind the house, I could get a good look at some of the things that were passing by, and also catch a few samples. Hundreds of pierids, especially *Anteos clorinde* Godart and *A. mærulea* Fabr. passed by, the former seeming to have the apex of the primaries margined with a smoky gray color, rather unusual and quite different from the normal white-apexed form found all the rest of the year. Several *Papilio* also flew by, but as I did not know well the species during the first migration, I could not tell what they were. From atop the roof I also observed that many *Eunica tatila* H. S. and *E. monima* Cramer probably made up the bulk of the migration. A *Heliconius charitonius* Linné was caught as it stopped momentarily to inspect some leaves. Several red and orange butterflies were seen as well as various other small and medium sized things, but as I said, I was not well acquainted at that time with the fauna and could not take notes of those species which I could not catch for future reference. *Eurema* species and many *Libytheana carinenta* Cramer also were noted, as well as a single *Danaus* and a few Blues. Many Hairstreaks were noted, but after closer observation, they seemed to be swirling about the branches of the trees behind

the house and not actually taking part in the migration. On the 16th of that month of May, at 5 o'clock in the afternoon, a great rainstorm came up and apparently put an end to the whole business, for the day after I saw not one butterfly engaged in what so many had been doing during the preceding days; at least not until the 18th, when once again I noticed *Anteos*, *Phæbis*, *Eurema*, and several nymphalids flying north along the Mérida-Valladolid road. On the 19th I believe the migration stopped for good.

The second migration that year was in the month of June, when in the afternoon of one day there suddenly appeared a large number of *Kricogonia lyside* Godart. This migration lasted only a few hours and was in a southerly direction. Perhaps only several hundred specimens were noticed, coming 3 or 4 at a time, in the place where I was. They were quite wary and difficult to catch, some of the difficulty arising from the fact that a strong wind accompanied them. The next four years were rather dry, being what we could probably consider a dry-year cycle. Of course there always was a certain amount of rainfall, but it was probably somewhat below the average. The season of 1957 was especially bad, not having rained for 2½ months beginning in mid-June to late August, in what should have been the height of the rainy season. It is curious to note that many species existed during these years in lesser numbers; even *E. monima* was almost completely absent if not extremely rare. No insect migrations of any sort were noticed during these years, except for a few local grasshopper plagues.

With the end of 1958, there began a marked increase of rainfall. Normally the rains cease here in the state of Yucatán about early October. However the months of October-December of that year were rather wet, with frequent rain squalls that lasted into March of this year, 1959. Most of these squalls were directly due to many "northers" that come down from the United States, which after crossing the Gulf of México and picking up much moisture, cause frequent rains along the hot lowlands of southern México. Then in May, many torrential rains fell over Quintana Roo and parts of Yucatán, giving at once a hint that we might be entering one of the wet-year periods. So far I have observed two migrations this year. The first was in Quintana Roo, between Santa Cruz, X-yatil, and Polyuc, on the 15th of May. Great swarms of *L. carinenta*, *E. tatila*, and *E. monima* were noticed flying at ground and tree-top level from north to south closer to the Caribbean coast near Santa Cruz; and from northwest to southeast further inland at X-yatil and Polyuc. There were great numbers of them, perhaps as many as 1,000 passing by every minute per 100 feet of roadway. The whole migration covered the road for a length of about 50 kilometers.

The second migration was noticed on June 12th, from about Xocchel to Tahmek, Yuc., a distance of about 10 kilometers along the road. Here the only species were *E. monima* and *L. carinenta*, or at least these were the only ones I observed. They were both flying rather weakly, and were in worn condition, whereas the migration in Quintana Roo the month before consisted of fresh specimens in almost all cases. Here they were crossing the road at say 100 per minute for 100 feet of roadway. *E. monima* has since been com-

mon everywhere. I even took about 30 specimens at blacklight one night right here in the middle of Mérida.

Any further migrations that may possibly occur in the current season will be commented upon in the *Journal* at a later date.

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### LARGE NUMBERS OF *NYMPHALIS CALIFORNICA* IN THE PACIFIC NORTHWEST IN 1959

*Nymphalis californica* Bdv. has been seen in very large numbers in several localities in the Pacific Northwest in 1959. My attention was first called to them on July 13 along highway 410 approaching Chinook Pass in Washington from the east. Considerable numbers of very worn, ragged specimens were flying along the road or resting where there was moisture, at 4,000 to 5,000 feet elevation. They had not been there June 30 and were practically gone by July 20. It was evident that they had come a long way. They could not have emerged locally, as I saw not more than two or three in that area in 1958.

On a trip to northern California late in July, I saw very few of this species. But returning by way of Crater Lake, Oregon, I encountered hundreds of them on August 4, flying about the rim of the lake, mostly going from north to south, perhaps just drifting with the wind. Many were lying in the road, having collided with cars. The elevation along the rim is about 7,000 feet.

On August 7, I drove to the summit of Mt. Spokane (elevation about 5800 feet) and began to see *californica* at wet spots along the road at 3,000 feet. The numbers reached a maximum at about 5,000 feet, where there were literally thousands of them, apparently flying aimlessly about or resting in the road where there was moisture. At one such spot I counted 50 in a square yard. At the summit they were also flying in considerable numbers, going in and out of the open door of the lodge, and sunning themselves on the bare rocks. Very few were on flowers. Mt. Spokane is northeast of the city of Spokane, about 425 miles from Crater Lake by airline.

On August 9 I was on Gisborne Mt., in the Priest River Experimental Forest in Bonner Co., Idaho, about 40 miles northeast of Mt. Spokane. Here there were only moderate numbers of *californica* at 4,000 to 5,000 feet.

All of the butterflies seen at Crater Lake, on Mt. Spokane and in Idaho were in fresh or nearly fresh condition. But in 1958 I was on Gisborne Mt. on July 20 and did not see any. So it is probable that in spite of the fresh-looking condition of this year's flight, they had come from some distance. But I have no information as to where they came from.