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INSECT MIGRATION IN THE PYRENEES

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Between September 19th and October 4th, 1951, we made a number of observations on migrations of insects and birds in the Pyrenees. This paper deals with the insect observations, which, while differing in details, were essentially similar to those made by Lack and Lack (1951) in September and October, 1950, in the same region. They found, in addition to butterflies and dragonflies, large numbers of Syrphid flies flying in a southerly or south-westerly direction from France into Spain. In their paper they summarise the previous published records of a southerly autumn migration of insects in Europe and discuss the questions raised thereby. This paper is intended to supplement the data given there and give the conclusions that we came to concerning the influence of the wind on the migratory movements. We should like to take this opportunity of thanking Dr. Lack for suggesting and making possible the trip, and for giving us the benefit of his previous experience of migration in the Pyrenees. Our choice of localities was due to his advice.

The chief observations were made at the Port de Gavarnie, Hautes Pyrenées, a narrow pass on the watershed of the Pyrenees, about 7,500 ft. up. Other less systematic observations were made at the Col de Pourtalet, Basses Pyrenées, and near Mont Louis and the Col de Puymorens, Pyrenées Orientales. In addition a movement of dragonflies was seen on the coast near Hendaye. All times are given in G.M.T.

OBSERVATIONS AT GAVARNIE

The Port de Gavarnie, a steep-sided pass or saddle, is at the head of a side valley which branches off from the main Gavarnie valley. The main valley runs nearly due south into the mountains, and terminates in the Cirque de Gavarnie, a vast amphitheatre of precipices, backed by some of the highest Pyrenean peaks. The side valley, leading up to the Port, runs west-south-west, becoming gradually narrower, until it ends in the Port itself, a narrow passage barely 20 yards wide. A similar valley runs up to the Port from the Spanish side. All the insects crossing the Port de Gavarnie from France into Spain were thus necessarily moving west-south-west.

Five days were spent in the Port between September 19th and 24th. On four of these days insect migration was seen. The volume and pattern of migration varied on different days according to the weather conditions.

September 19th. Cloudless sky: moderate wind from the French side, dying down in the afternoon and becoming light.

A few butterflies were going over from 11.30 hrs., mostly clouded yellows (*Colias croceus* (Goff.)) at first. From 14.30 small whites (*Pieris rapae* (L.)) predominated, the clouded yellows becoming fewer. Pale yellow butterflies (two that were collected were *C. croceus* var. *helice* Hb.) were seen in small numbers throughout this time. At 15.15 the passage had almost stopped, odd individuals only being seen until departure at 17.08.

The insects had a slight following wind, and were flying at 6 to 10 ft. Numbers were small but steady. A count from 12.00 to 12.35 in 5 minute intervals gave the following numbers every 5 minutes: 3, 4, 3, 3, 4, 3, 3. Probably not many were missed. Later, numbers increased slightly, but there were never very many. No other migrating insects were seen this day.

September 20th. Cloudless sky: no wind until 15.45, then a light warm breeze from the Spanish side, increasing gradually.

Butterflies were going over from 11.45 (time of arrival), not in large numbers. At 13.00 the passage was estimated at 28 per hour, at 15.00 90 per hour, and at 16.15 over 250 per hour. By 16.30 migration was slackening, and by 17.30 it had nearly stopped. When there was no wind, i.e. up to 15.45, butterflies could be seen passing over at all heights, not only through the Port itself but also several hundred feet up the hillside north of the Port.

Clouded yellows predominated, considerably outnumbering the small whites. Red admirals (*Vanessa atalanta* (L.)) were regular in small numbers, especially later in the day. Syrphids were not noticed until the wind got up. From then on they crossed in increasing numbers, flying at 0 to 2 feet. At 18.14 (time of departure) they were still streaming over. Solitary dragonflies were seen crossing from early in the day, when there was no wind, both in the Port and up the hill on the north side. From 16.00 they became frequent, though actual numbers were difficult to estimate. They flew at 1 to 2 feet, occasionally settling. The vast majority were *Sympetrum striolatum* (Charp.), many with a red abdomen, but one or two larger ones, perhaps *Aeshna* sp., were seen.

September 21st. Cloudless sky: fresh wind from the Spanish side, freshening a little in the late afternoon.

Butterflies were crossing from 11.45 (time of arrival) in rather smaller numbers than the dragonflies (see dragonfly counts). Clouded yellows predominated, the dark outnumbering the pale by about 10:1. Red admirals were in smaller numbers, being prominent later in the day. There were also a few small whites, one swallowtail (*Papilio machaon* L.) and one hummingbird hawk-moth (*Macroglossum stellatarum* (L.)). When the wind became strong late in the afternoon, most of the butterflies were unable to cross. Consequently a concentration developed on the leeward side of the pass, and most of the butterflies eventually settled in sheltered places after making unsuccessful attempts to cross. It was noticeable that the red admirals were stronger fliers than the clouded yellows, crossing when the latter could not. The single swallowtail came up to the Port, but apparently could not cross, though it tried two or three times.

In the morning and early afternoon Syrphids were crossing in large numbers. At least 5 to 10 were crossing every second in the 10 yard strips used for the dragonfly counts. Four species were collected, *Eristalis tenax* (L.), *Syrphus vitripennis* Mg., *Xanthandrus comtus* (Harris) and *Episyrphus balteatus* (Degeer). *E. tenax* seemed the most abundant, but this may have been because its large size made it much more conspicuous than the others. When the wind became strong, Syrphids were held up like the butterflies, thousands being concentrated in the lee of the Port. Dragonflies were crossing the whole time, though some of them also were held up in the late afternoon by the wind. Nearly all were *S. striolatum*, mostly males. One large metallic blue species (*Aeshna* ?) was also seen crossing. The passage was regular and sustained, as indicated by the following counts in 5 minute intervals:

11.45-12.15: 27, 25, 20, 16, 22, 25
15.15-15.45: 20, 24, 14, 22, 14, 15

September 23rd. Rain all day: strong wind from the Spanish side. Port filled with clouds.

No insects moving.

September 24th. Lower valley filled with clouds, upper valley clear. Clouds billowing through the Port till 13.20, when they gradually cleared away. Strong wind from the Spanish side, moderating somewhat at 13.20.

From 12.00 dragonflies were coming up from the French side towards the Port and entering the cloud, but apparently none could get across. At first a large blue species (*Aeshna* ?) outnumbered *S. striolatum*, probably because the wind was very strong at this time and the latter were not able to get up into the Port in such numbers. By 12.35 dragonflies were crossing in small numbers, the successful ones being those that kept very low over the middle of the pass. Others, which came up along the shoulder to the north, were invariably carried back on reaching the watershed. Many *S. striolatum*, now and later, were settled in sheltered places, in some places so numerous that one

disturbed them at every step. At 12.54 Syrphids were noted, coming up like the dragonflies and in most cases being blown back. By 13.10 they were coming up in great numbers and still all being blown back. At 13.14 the first butterflies were coming up, though many had earlier been seen in shelter lower down on the leeward side of the Port. None were able to cross. At 13.20 the wind moderated and the cloud lifted. By 14.35 dragonflies, mainly *S. striolatum*, were crossing in great numbers. An uncountable stream of them, several thick, was passing continuously. At 14.46 one hummingbird hawk-moth came up, flying strongly, and probably crossed. From now on butterflies were collecting in fair numbers, but none were seen to succeed in crossing. The usual species were present in the usual proportions, except that red admirals were relatively commoner than before, probably because, being strong fliers, more of them had managed to reach the Port. Many clouded yellows were settled, clinging to the grass.

OBSERVATIONS ELSEWHERE IN THE PYRENEES

September 25th-26th. Col de Pourtalet. Cloudy sky: moderate north winds. A few clouded yellows were seen near the Col, flying south-west towards Spain. There seemed to be nothing to concentrate them in this region.

September 30th-October 1st. Col de la Quillane, near Mont Louis, and hills north-east of Mont Louis, on the north side of the Tet valley. Clear sky and light east wind on the 30th, partly clouded sky and moderate west to south-west wind on the 1st.

Clouded yellows, small whites, red admirals, *S. striolatum* and a probable *Aeshna* sp., in roughly the same proportions as at Gavarnie, were the main species seen migrating. All migrations were slight and widely scattered, but on the hills north-east of Mont Louis there was apparently a slight concentration on the 1st, with a contrary wind, as compared with the 30th, when there was a following wind. On the 1st one painted lady (*Vanessa cardui* L.) was seen migrating.

October 4th. Col de Puymorens and mountain sides to the west of the Col. Sky mainly clear in the morning: slight east wind. During the day the wind backed to north-east and more clouds came up. At 14.00 the clouds thickened and there was some rain. The sky partially cleared again at 16.30.

From 12.10 dragonflies were going over at all heights. Some were only visible through binoculars. Apparently they were taking no notice of the contours. At 12.40 the first clouded yellows were seen, travelling south. At 13.43 one hummingbird hawk-moth was seen, also going south. The migration continued until 15.40, when the weather deteriorated. One red admiral and one small white were the only other migrating insects seen. The general course was south to south-west, this being modified to a certain extent by a tendency to follow along the contours of the ridge or hill-side up which they were going. While the weather was fine some butterflies as well as dragonflies were seen going over very high.

BEHAVIOUR IN VARYING WIND CONDITIONS

Unfortunately we had no anemometer and so could not measure the wind speed directly; but both of us had previous experience in assessing wind strength within the limits of the Beaufort wind scale. Using this scale we found in the mountains that the effects of different winds on the migratory behaviour of insects were as follows:

(1) *Following wind and no wind.* No strong following winds were experienced. In light following winds and no wind migratory behaviour was indistinguishable. The butterflies alone showed a tendency to keep low (under 10 ft.), but were fewer at this height than at any other time, e.g. less than 15 per hour at Gavarnie on the morning of September 20th. At the same time two butterflies were seen over 200 ft. up in the field of the binoculars while looking for birds, suggesting that they were crossing at various heights.

Very few dragonflies were seen at Gavarnie in these conditions, but at Puymorens on the morning of October 4th, with a light following wind, they were observed through binoculars, together with butterflies, crossing at all heights regardless of contours. No Syrphids were seen.

(2) *Contrary wind, force 1-3*.* Light headwinds invariably resulted in an increase in low-flying insects of all kinds. At Gavarnie on the afternoon of September 20th the butterfly count rose to more than 60 per hour at 15.30, and reached over 250 per hour by 16.15, as the wind increased. Dragonfly migration became regular, reaching about 40 per hour the same

* Force 1-3, 1-12 m.p.h.; force 4, 13-18 m.p.h.; force 5, 19-24 m.p.h.

afternoon, and Syrphid flies were now in evidence for the first time, rapidly becoming very much more numerous than any other insects.

At the same time many butterflies were observed hugging the shoulders of the pass rather than going over at the lowest point, and 100 ft. up the south side were hardly less numerous than in the pass; but here Syrphids were only about half as numerous as in the pass itself, and no dragonflies were seen. A characteristic of all the migrants up on the shoulders was that their flight was never horizontal but always inclined downwards into Spain, as though, on reaching the watershed, they saw that they had gained an unnecessary amount of height.

(3) *Contrary wind, force 4.* The concentration of butterflies did not appreciably increase with strengthening wind compared with the other insects: they were still noticeable on the shoulders. At Gavarnie in the early afternoon of September 21 dragonflies were going by at a rate of more than 200 per hour over a 10 yard stretch in the middle of the pass, and they too began to appear on the shoulders. 200 ft. up on the north side, a little later, they were passing at the rate of about 30 per hour on a similar 10 yard stretch. Syrphids were crossing the pass at the rate of 5 to 10 per second over a 10 yard stretch in the pass.

(4) *Contrary wind, force 5.* Above force 5 the insects began to be successively impeded in crossing the neck of the pass, resulting in a remarkable concentration of resting insects, together with buzzing clouds of Syrphids, in the shelter just below the top of the pass on the French side. As the wind increased the butterflies were the first to be stopped, clouded yellows and small whites before red admirals, which at one time were the only butterflies crossing: then the smaller Syrphids (*S. vitripennis*, *X. comtus*, *E. balteatus*): and then, together, *S. striolatum* and the larger Syrphids (*E. tenux*): finally a large blue dragonfly (*Aeshna* ?), which in these conditions appeared for the first time in appreciable numbers.

Even when no longer possible the crossing would still be attempted, and in the fresh winds on September 24th many butterflies were seen being blown back hundreds of yards out over the French valley in the space of seconds. Those that succeeded in crossing in such conditions were always the ones that kept very low, almost brushing the ground. The others, even if not carried straight away, were always caught on reaching the far side of the pass by the powerful up-current produced by the wind blowing up from the deep valley on the Spanish side, and carried back high over the middle of the pass to the French side. When the wind was very strong even the swallows (*Hirundo rustica* L.) that attempted to cross were swept back in exactly the same way.

From this it is probably safe to conclude that these movements show no tendency to be anything other than widespread and high up except when headwinds necessitate the maximum use of ground cover, and it is only then that sufficient concentration occurs for a migratory flight to be easily detected and recognised.

A single set of records down at sea level seems to confirm this. On September 25th quite large numbers of a small red-bodied dragonfly, almost certainly *Sympetrum*, were seen at Hendaye crossing the estuary of the Bidassoa into Spain. Here the contrary wind was of the same order (force 4) as caused their concentration in the Port de Gavarnie, but the ground was very different (see sketch-map). Nevertheless, on watching, it became evident that firstly, in approaching their crossing point they were nearly all sheltering from the then offshore wind by flying low along the beach in the cover of the sea-wall and the houses fronting the 'plage'; and secondly, that almost all of them actually crossed the river on a very narrow front, less than 100 yards wide, in the curve of a low breakwater of piled rock; and furthermore, their flight-lines unquestionably converged

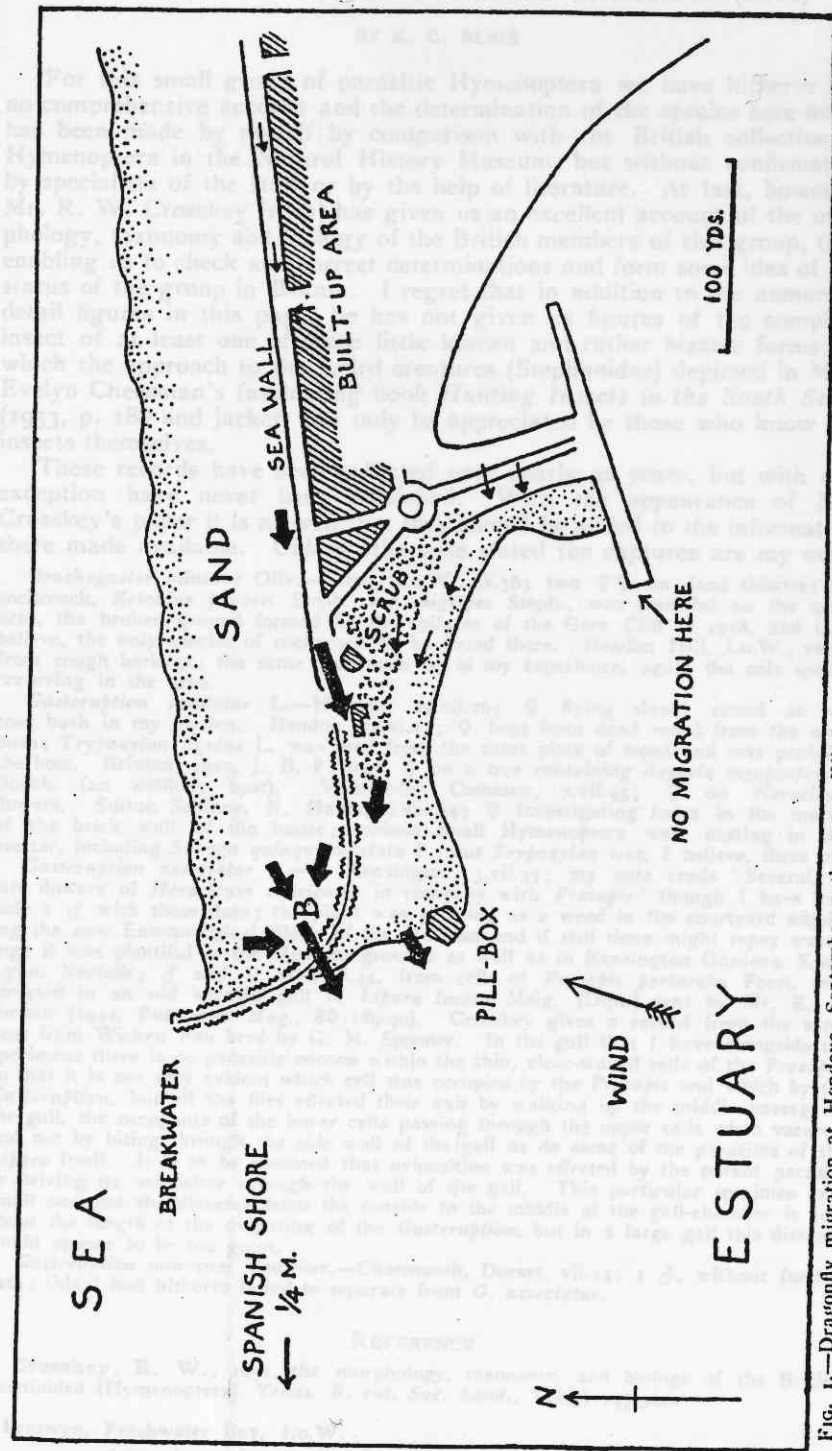


Fig. 1.—Dragonfly migration at Hendaye, September 25th, 1951. Wind 190, force 4: sky clear. Arrows indicate directions of flight, as follows: long broad arrows, more than 350 per hour; short broad arrows, more than 150 per hour; short narrow arrows, isolated single observations.

on this 'jumping-off point.' This place, marked B on the sketch-map, proved to be the furthest point upwind in their general direction of flight behind which appreciable shelter was available near the ground. In approaching it they all flew very low over the sand. Once over the water they were, of course, much more difficult to see, but appeared to cross the estuary at all heights, though many still kept low. A small proportion of these dragonflies were flying *in copula*.

Dr. Lack informs us that the Misses Twemlow have regularly, during the last twenty years, seen dragonfly migrations, against strong contrary winds, near the coast in this district.

ACKNOWLEDGMENT

We are much indebted to Mr. E. Taylor for identifying for us the insects collected, and to Mr. J. E. Collin for checking the Syrphids.

REFERENCE

Lack, D. & Lack, E., 1951, Migration of insects and birds through the Pyrenees, *J. anim. Ecol.*, 20:63-7.

Edward Grey Institute of Field Ornithology, 91 Banbury Road, Oxford.
December 6th, 1951.

A Cimex (Hem., Cimicidae) on a bat in flight.—An adult female noctule (*Nyctalus noctula* Schreber) shot in flight at Little Chesterford, Cambs., on the evening of September 2nd, 1950, was found to be carrying a *Cimex* (*C. pipistrelli* Jenyns?), which was discovered 45 minutes after the death of the bat. The other ectoparasites taken were two fleas and many mites. This record is given because *Cimex* is regarded as a rare roost parasite of bats; I know of no other report of it having been taken on a flying bat. Unfortunately the bat and its parasites were lost in the post and so further data are unobtainable.—OWEN GILBERT, Zoology Dept., University College, Bangor, Caerns.: September 25th, 1951.

Roeseliana roeselii (Hagenb.) (Orth., Tettigoniidae) in Hampshire.—Males and females of this local long-horned grasshopper were found on August 19th, 1939, in a coastal marsh near Lyminster, Hants. It was the curious song of the male which first attracted attention. The song (Brown, 1948, *Ent. mon. Mag.*, 84:150) is a long-continued vibrant sound, considerably shriller than that of the great green grasshopper, *Tettigonia viridissima* L., but (at least to me) not so penetrating.

M. Burr (1936, *British grasshoppers and their allies*, London: 148) gives the distribution as coastal, from Kent, Essex, Lincolnshire and Yorkshire. Since then it has been recorded from the Stour Valley, Suffolk, close to the Essex border, by K. H. Chapman, E. S. Brown and other workers from Flatford Mill (1948, *Ent. mon. Mag.*, 84:101, 150, 259), but how far the species spreads in Suffolk is doubtful. I have not met it in the neighbourhood of Aldeburgh, Suffolk, whereas it was very common in 1948 on the Essex coast both north and south of Walton-on-the-Naze. Until recently the species was known only from coastal localities, but Southwood (1948, *Ent. mon. Mag.*, 84:231) has found it at East Peckham, a few miles east of Tonbridge in mid Kent; Menzies and Airy Shaw (1947, *Ent. mon. Mag.*, 83:151) have reported specimens from Cheam, Surrey, and Collins (1949, *Ent. mon. Mag.*, 85:50) found another colony eight miles to the east, at Aidington. There are also specimens in the Hope Department, Oxford, collected by P. Freeman in 1936 at Billericay, Essex. The nearest of these localities is 60 miles from Lyminster.

My specimens from Lyminster, which have been deposited in the Hope Department, belong to the normal flightless form with short wings; but the long-winged form, presumed to be capable of flight (var. *diluta* Charp.) has been recorded by Blair (1934, *Ent. mon. Mag.*, 70:259-61) from Benfleet, Essex, where it formed about 30% of the population, and both forms have been found at Flatford and at Cheam; but in most localities far too few specimens have been examined to get any idea of the proportion of the variety in the population. It needs to be urged that such studies should be made by marking and liberating specimens rather than by killing large numbers of this uncommon insect.—G. C. VARLEY, Hope Department of Entomology, University Museum, Oxford: October 5th, 1951.

SOME FURTHER RECORDS OF BRITISH EVANIOIDEA (HYM.)

BY K. G. BLAIR

For this small group of parasitic Hymenoptera we have hitherto had no comprehensive account and the determination of the species here noted has been made by myself by comparison with the British collection of Hymenoptera in the Natural History Museum, but without confirmation by specialists of the staff or by the help of literature. At last, however, Mr. R. W. Crosskey (1951) has given us an excellent account of the morphology, taxonomy and biology of the British members of this group, thus enabling us to check and correct determinations and form some idea of the status of the group in Britain. I regret that in addition to the numerous detail figures in this paper he has not given us figures of the complete insect of at least one of these little known and rather bizarre forms, in which the approach to the weird creatures (*Stephanidae*) depicted in Miss Evelyn Cheesman's fascinating book *Hunting Insects in the South Seas*, (1933, p. 188 and jacket) can only be appreciated by those who know the insects themselves.

These records have been collected over nearly 30 years, but with one exception have never been published. With the appearance of Mr. Crosskey's paper it is as well that they should be added to the information there made available. Unless otherwise stated the captures are my own.

Brachygaster minutus Oliv.—Niton, I.o.W., ix.36; two ♀♀ on dead thistles; the cockroach, *Ectobius panzeri* Steph. var. *nigripes* Steph., was plentiful on the same area, the broken ground formed by the collapse of the Gore Cliff in 1928, and is, I believe, the only species of cockroach to be found there. Headon Hill, I.o.W., swept from rough herbage; the same cockroach is, in my experience, again the only species occurring in the area.

Gasteruption jaculator L.—Hendon, 14.vii.26; ♀ flying slowly round an old rose bush in my garden. Hendon, 14.vi.27; ♀ bred from dead wood from the same bush; *Trypoxylon fuligulus* L. was bred from the same piece of wood and was probably the host. Brixton, 1929, J. B. Farmer, ♀ on a tree containing *Aegeria myopaeformis* Borkh. (an unlikely host). Wimbledon Common, 7.vii.45; ♀ on *Heracleum* flowers. Sutton Scotney, N. Hants, 6.viii.44; ♀ investigating holes in the mortar of the brick wall of the house; various small Hymenoptera were nesting in this mortar, including *Sapyga quinquepunctata* F., but *Trypoxylon* was, I believe, there too.

Gasteruption assectator L.—S. Kensington, 3.vii.33; my note reads 'Several, at late flowers of *Heracleum sibiricum*, in company with *Prosopis*' though I have now only 1 ♂ with these data; the plant was growing as a weed in the courtyard adjoining the new Entomological Block of the Museum and if still there might repay watching; it was plentiful in the Museum grounds as well as in Kensington Gardens. Kings Lynn, Norfolk; ♂ and ♀ bred vi.44, from cells of *Prosopis pectoralis* Forst. constructed in an old vacated gall of *Lipara lucens* Meig. (Dipt.) sent by Mr. E. L. Swann (1944, *Ent. mon. Mag.*, 80:180-90). Crosskey gives a record from the same host from Wicken Fen bred by G. M. Spooner. In the gall that I have alongside the specimens there is no parasitic cocoon within the thin, clear-walled cells of the *Prosopis*, so that it is not very evident which cell was occupied by the *Prosopis* and which by the *Gasteruption*, but all the flies effected their exit by walking up the middle passage of the gall, the occupants of the lower cells passing through the upper cells when vacated, and not by biting through the side wall of the gall as do some of the parasites of the *Lipara* itself. It is to be assumed that oviposition was effected by the parent parasite by driving its ovipositor through the wall of the gall. This particular specimen is a small one and the distance from the outside to the middle of the gall-chamber is just about the length of the ovipositor of the *Gasteruption*, but in a large gall this distance would appear to be too great.

Gasteruption minutum Tournier.—Charmouth, Dorset, vii.24; 1 ♂, without further data; this I had hitherto failed to separate from *G. assectator*.

REFERENCE

Crosskey, R. W., 1951, the morphology, taxonomy, and biology of the British Evanioidea (Hymenoptera), *Trans. R. ent. Soc. Lond.*, 102(5):247-301.

Pentwyn, Freshwater Bay, I.o.W.

September 16th, 1951.