

THE GARDENS OF THE HAIRY ANTS.

While working at the preceding it was discovered that somewhat similar fungus gardens occur in the nests of *Apterostigma*. Four species were studied. All have the same fungus, belonging apparently, however, to a different genus from *Rozites*. These hairy ants live in decaying wood and have small gardens 4-8 cm. in diameter, built of bits of wood-fibre, beetle-dung, &c. The chief point of interest is that though all have the same fungus yet all have not cultivated and selected the Kohl-rabi to the same degree. *A. Wasmanni*, Forel, has a well-developed type with large spherical swellings on the ends of the hyphæ. The others have Kohl-rabi of a much lower type, the hyphæ being only slightly swollen into a club shape, and they are not aggregated into regular groups.

It was, as usual, found impossible to obtain by artificial culture the highest fructification of the fungus, so its systematic position is still undetermined.

THE GARDENS OF CYPHOMYRMEX.

This genus of ants is closely related to the two preceding, and the two species examined (*C. auritus*, Mayr, and *C. strigatus*, Mayr) are also fungus-growers. Both form nests like those of *Apterostigma*, and use similar material in the garden. The two species have the same fungus, but *C. strigatus* obtains far finer Kohl-rabi than *C. auritus*, just as we have seen to be the case with the species of *Apterostigma*. It is thus pretty evident that the large size of the best Kohl-rabi must be due to selection and cultivation on the part of the ants.

The concluding pages of the work are taken up by a discussion of the mycological results of these investigations, for which reference must be made to the original. The work is illustrated by beautiful plates, and forms as a whole one of the most fascinating contributions to botanical literature that have been made for many years.

JOHN C. WILLIS.

A FEW REMARKS ON INSECT PREVALENCE DURING THE SUMMER OF 1893.

WE are hearing a great deal just now of unusual amount of insect presence, and there appears no reason to doubt that such is very much the case, although for scientific use we need much more of reliable report than we possess as to what kinds of insects are noticeably more present than in seasons of ordinary meteorological conditions, and also we need observations as to what kinds may be unusually absent.

So far as my own acquaintance with the subject (which is mainly in reference to amount of presence of crop insects) allows me to judge, these unusually large amounts where they occur—for the superabundance does not affect all kinds—may be attributed to weather influence acting either directly on the development of the insects themselves, or so affecting the state of their crop-food-plants as to induce the conditions which we know well by the agricultural experience of many years are favourable to establishment of infestation.

The important preliminary as to there having been really such a definite deficiency in rainfall as to amount to what may be called "a drought" over England and Wales, we have stated shortly in the *Monthly Meteorological Magazine*, of Mr. G. J. Symons, F.R.S., No. cccxxi, p. 98, as follows:—"Assuming that the twenty-four stations fairly represent England and Wales, we find that in March the rainfall was only one-third of the average, in April one-sixth, in May three-quarters, and in June two-thirds." Mr. Symons further points out that "this, of course, is taking the country as a whole; at many individual stations the results would be much more striking, e.g. at Bodmin in the three months" (March to May) "only one fifth of the average fell."

Amongst insect attacks especially subject to increase

by stunting of growth, or over-maturation of sap of their food plants, are those of the Aphides or Plant Lice, which have been—so far as my own contributors' reports show—unusually early and prevalent this year. They were forwarded on mangolds from Devonshire almost as soon as there could be said to be good accommodation for attack on the leafage, and turnips and cabbage leafage, damson early in the season, and larch later on the borders of England and Scotland, were some of the tree and food plant habitats which were exceptionally afflicted. These prevalences agree with the rule of Aphis life laid down by Mr. G. B. Buckton, F.R.S., our great authority on Aphis life. In drawing attention to the abnormally rapid increase of Aphides under some circumstances, he accounts for it by maturity (*i.e.* power of reproduction) taking place earlier in the life stage where from various causes inducing want of supply of nutriment, structural changes occur consequently on these in the larvæ of the Aphides subsequently born. (See "Brit. Aphides," by G. B. Buckton, F.R.S., vol. i. p. 72).

Besides the above reasons for increase, we have also the negative reason of absence of destruction by good drenching rains to wash off and often to drown the enemy. One of my correspondents wrote me that he had been doing this or that, but the best help was the welcome rain.

The above may be taken as a type of one way in which weather influence acts; in the case of wasps, which popularly represent much of insect presence to the world at large, we have another set of influences.

Our recent drought began in March. In many years we have the most variable weather at this season, and the queen wasps, the foundresses of the coming colonies, being tempted from their winter localities of hibernation by a day or two's warmth, are caught, it may be, by heavy rain, or by snow, or by frost, and perish. This year weather was more favourable to them, and we had not the drenching rains which in an ordinary year put an end to many an embryo nest with its few grubs, whether in ground or hedge. The first commencement, formed of a tiny piece of paper, in shape like an umbrella, with beneath it a pendant ending in a club formed of a few cells, each with its egg or young maggot tenant, is delicate in the extreme. If the cavity in which it is placed in the ground is flooded, its destruction is certain, or if in storms the foundress cannot return to feed the young family they must perish.

In the case of wasps, probably weather influences, which affect amount of any particular kind of food are as little troublesome as to any insect. All who at all study their habits are aware that flesh, fish, insects to a large amount, and fruit to utter rapacity of consumption, are constantly utilised by them for their own special support or that of the maggot family. To what extent the adult wasps may feed on other than vegetable matter I cannot say, but dissection and examination of the undigested food in the blind pouch of the food canal of the larval wasp has shown this to consist of remains both of animal and vegetable matter; in the record before me chiefly of insect *débris*. Their varied kind of food and their wonderful adaptability of instinct in making adverse circumstances suitable for the household needs, make the wasp family when once established, most prolific pests.

The great prevalence of what are called surface caterpillars, that is, the larvæ of various kinds of *Agrotis* at the roots of various kinds of field crops, gives an example of increase of presence of the Lepidoptera, under circumstances favourable to the development of the imago from the chrysalis, and subsequently to the pairing of the moths and successful egg deposit. In wet and chill weather, when the moths hang about torpidly, a certain proportion of them get drenched, so that their wings are of little service; the larvæ are injured in different ways, or disease induced, much influencing amount of presence.

In the past season such attacks as that of the great caterpillars (four inches or more in length) of the Lappet Moth, the *Gastropacha quercifolia* scientifically, to apple leafage; or again, the presence of caterpillars of the little *Pyralis glaucinalis* might reasonably be supposed to be influenced by weather. In the first case, the great size of the larva feeding on the leafy twig exposes it much to alternations of weather, and in the second, where, as in the samples sent me, the infestation was located in the outer part of fodder stacks, the penetration of wet which might soak the filmy cocoons with their developing contents, would cause conditions very different to the long-continued appearances of the present summer.

To go through the different orders of insects, specially represented, or the different dates and amounts of their appearance on the crops, would be too long here, but I can safely say that whilst the drought lasted I had constant applications regarding insect appearances, including a much greater variety than usual of kinds little observed in ordinary years, and in some cases unusual amount of presence of our common kinds.

Various representatives of the Acarina, as the currant, pear, and plum Phytopti were of course largely noticed, as also the Phytopti (or gall mites) of the hazel buds, of which the galls loaded the hazel boughs in this neighbourhood early in May to a degree I have never before seen. The kind of (so-called) "red spider" (*Bryobia praeliosa*) which ordinarily is chiefly found on ivy, extended its injurious presence so widely to gooseberry leafage as to necessitate careful, and happily successful, measures to get it under.

Why, with all this, various crop insect attacks were less reported than customarily remains uncertain. Corn Aphides as yet have not been complained of. Possibly this is by reason of the heat hardening the ears so that they were in a condition to withstand attack before the Aphides arrived on the heads to endeavour to pierce into them with their suckers. In countries where the climatal conditions can be counted on, this point (of arranging date of crop so as to protect itself from attack) is one of the regular methods of prevention. Another infestation which threatened to be very troublesome, but of which the second brood did not make any noteworthy appearance in various places, is that of the mustard beetle. Why this should be so I am as entirely at a loss to explain as the crop inspector who reported the state of things to me.

Various other absences of attack remain also unexplained, but are duly noted for possible future service in agricultural entomology.

So far as I can gather from contribution of my own correspondents, or other accessible sources of information, I should consider that such extra amount of insect presence as has occurred, has been owing to weather influence. We have had earlier and more numerous development of many kinds, and also in the case of various common crop insect pests, the hardness of the soil, and other conditions incident to drought, which made it totally impossible to bring either stimulating dressings, or mechanical measures to bear, necessitated our permitting increase to go on unchecked in some cases, and in some, though the caterpillars just below the surface of the ground necessarily did not themselves multiply, their unattainable legions swelled the numbers of observable pests, and probably will supply us a plentiful brood of moths for further continuation of species.

There does not appear to be any reason from previous circumstances, or from importations, to consider that we were suffering from other than the ordinary attacks, which, in a changeable climate like ours, must be changeable in their amounts; at least, so it appears to me from such an amount of report as I possess.

ELEANOR A. ORMEROD.

THE GREAT HEAT OF AUGUST 8 TO 18.

AN extraordinary wave of high temperature passed over this country between the 8th and 18th of this month, which has also been remarkable on account of the continuance of the heat during several consecutive days. High temperatures were experienced in all parts of the United Kingdom, but more especially in the southern and eastern portions of the country. The following table shows their distribution as represented by the stations included in the *Daily Weather Report*:-

Stations.	Days with temperature of 75° or more.	Days with temperature of 80° or more.	Days with temperature of 85° or more.	Days with temperature of 90° or more.	Days with temperature of 75°-90° or more.	Maximum temperature.	Date.
Leith	5	—	1	—	6	85	15
North Shields ...	3	2	—	—	5	83	18
York	5	4	1	—	10	86	18
Loughborough ...	1	4	5	1	11	91	18
Liverpool	4	2	1	—	7	85	17
Parsonstown	5	2	—	—	7	82	14 and 16
London	—	4	4	3	11	93	18
Oxford	4	2	5	—	11	89	17 and 18
Cambridge	3	2	4	2	11	92	18
Jersey	4	4	3	—	11	89	17

A glance at this table shows that at Loughborough, Oxford, Cambridge, London, and the Channel Islands the temperature reached or exceeded 75° on every day of the period in question, the maxima reaching 91° at Loughborough on the 18th, 89° at Oxford on the 17th and 18th, 92° at Cambridge on the 18th, 93° in London on the 18th, and 89° at Jersey on the 17th.

At Greenwich the temperature exceeded 80° on each successive day from the 8th to the 18th inclusive, the highest readings being 93° on the 16th, 94.2 on the 17th, and 95.1 on the 18th. The last reading has only been exceeded twice at any time of the year during the last half-century, viz., 96.6 on July 22, 1868, and 97.1 on July 15, 1881. The highest reading in the sun during the eleven days in question was 146.2 on the 18th, but this temperature was slightly exceeded in June last. Mr. Symons states that, on the 18th instant, the thermometer at his station at Camden Town registered 93.6, which has only once been exceeded during thirty-six years (1858-93), viz., on July 15, 1881, when it read one degree higher; the present is the only year with a maximum shade temperature above 90° for three consecutive days. On the night of the 17th instant the minimum temperature in South London was as high as 72°, being rather above the average maximum temperature for the month of August, and the daily mean, as deduced from the maximum and minimum readings in the *Daily Weather Report* for the 18th, was 82.5; this mean value is probably the highest on record since trustworthy observations have been taken. In a valuable paper recently read by Mr. Ellis before the Royal Meteorological Society, the average mean temperature at Greenwich for that day is given as 62.5.

On the Continent the highest readings quoted in the *Daily Weather Report* were 102° and 106° at Rochefort in France on the 13th and 14th instant, while the maximum readings there reached or exceeded 90° on seven consecutive days. In the South of France the temperature exceeded 80° on each day of the period in question, 100° being recorded at Biarritz on the 17th.

The Weather Charts published by the Meteorological