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## A MESOLITHIC SITE ON THE SOUTH-EAST DURHAM COAST.

A. RAISTRICK, M.Sc., Ph.D., F.G.S., G. COUPLAND, F.G.S., and F. COUPLAND.

A preliminary note of this site was published in 1933 (1) and its relation to other coastal sites was suggested in a further paper on the coastal sites of Northumberland and Durham, in 1934 (2), but no detailed account was given, nor was more than an indication of the nature of the cultures represented offered. As the number of flints obtained from a very restricted area now is more than 9,000, it is possible to present a more or less complete picture of the various occupations and cultures of this site.

The site is situated at the mouth of the Crimdon Dene, about 2 miles north of West Hartlepool, where the small burn makes a southerly bend as it approaches the sea, forming on the north side a longish spur, between the shore and the burn. This spur is actually a small cliff of boulder clay, covered in part by blown sand. To the south of the burn is a long stretch of sands, backed by a belt of low sand dunes with only occasional very low cliffs. North of the site stretches one of the most austere rocky coastlines of the north-east, with its miles of high cliffs of magnesian limestone, broken only by the numerous small ravines or denes, at the mouths of which are generally to be found small and more scattered mesolithic sites (3). The boulder clay spur though narrow, is flat topped, and retains patches of the wind-blown sand that until recently completely covered it. It is being encroached upon by a colony of week-end and holiday wooden bungalows, and becoming a very popular picnic site, hence the necessity for intensive work during the last few years, and the full recording of the site before it disappears. The flints are scattered over most of the small area of the spur, but show a decided tendency to be most prolific at one or two restricted spots, a few yards in diameter, particularly near the point of the spur. The flints can be seen to be associated mainly with a thin grey sand layer, resting directly on the boulder clay surface and covered by the yellow sand of the sand dunes. This grey sand is seen in places along the coast to be the residual from an early line of smaller sand dunes.

The preliminary note in 1933 was based on a collection of about 5,000 flints, made by one of the present writers (A.R.) and T. S. Westoll. Since that date the collecting has been continued and the present paper is descriptive of a further collection of nearly 9,000 flints, including 671 collected by G. B. Gibbs, to whom we offer our thanks for the free use of his material.

The site was evidently used as a manufactory for small implements, as the greater part of the material is chipping debris, either smallish chips or fragments of spoilt or broken blades and tools, all classified together as "roughs" and numbering in the present collection about 6,500. Along with this is an abundance of cores, about 230, mostly of the typical nearly parallel-sided type, and a large proportion of blades, of flat triangular or trapezoid section, nearly 1,500 in all. Of the blades about half are broken, mostly at the end remote from the bulbar portion, and evidently rejected. Occasionally the broken blades, if the break is at all diagonal, have been re-trimmed to make fairly serviceable points. In a separate category are the blades that have received secondary working along one or both edges, and the blades sometimes described as "batter-back," one edge being very effectively blunted by chipping, the other being a sharp edge, not usually chipped. Microliths are present, rather more than a hundred being recorded, and are of the usual "harpoon-barb" form, long and well-sharpened triangles, and "rods" with secondary working over one or both long sides. In addition to this material which is typical of all the coastal sites, there is present a small percentage of larger artefacts, which include several beautifully worked arrow points of "leaf shape" and "barbed" forms, formerly accepted as typical of neolithic and bronze-age cultures respectively. There are 5 leaf shaped arrow points, and 4 barbed and tanged points, along with a few very heavy cores and points that on a usual surface site would be called neolithic.

The principal types of implement are illustrated in the Figs. I, II, and III, and a brief description follows.

*Cores.*-These are mostly roughly cylindrical or conical, fluted round most of the circumference by the scars of lengthwise flakes. The striking platform end is usually rather battered by long use, the other end often retaining some of the outside "skin" of the original pebble. In some cases this distal end has been sharpened by taking off two flakes at a sharp angle, while the striking platform

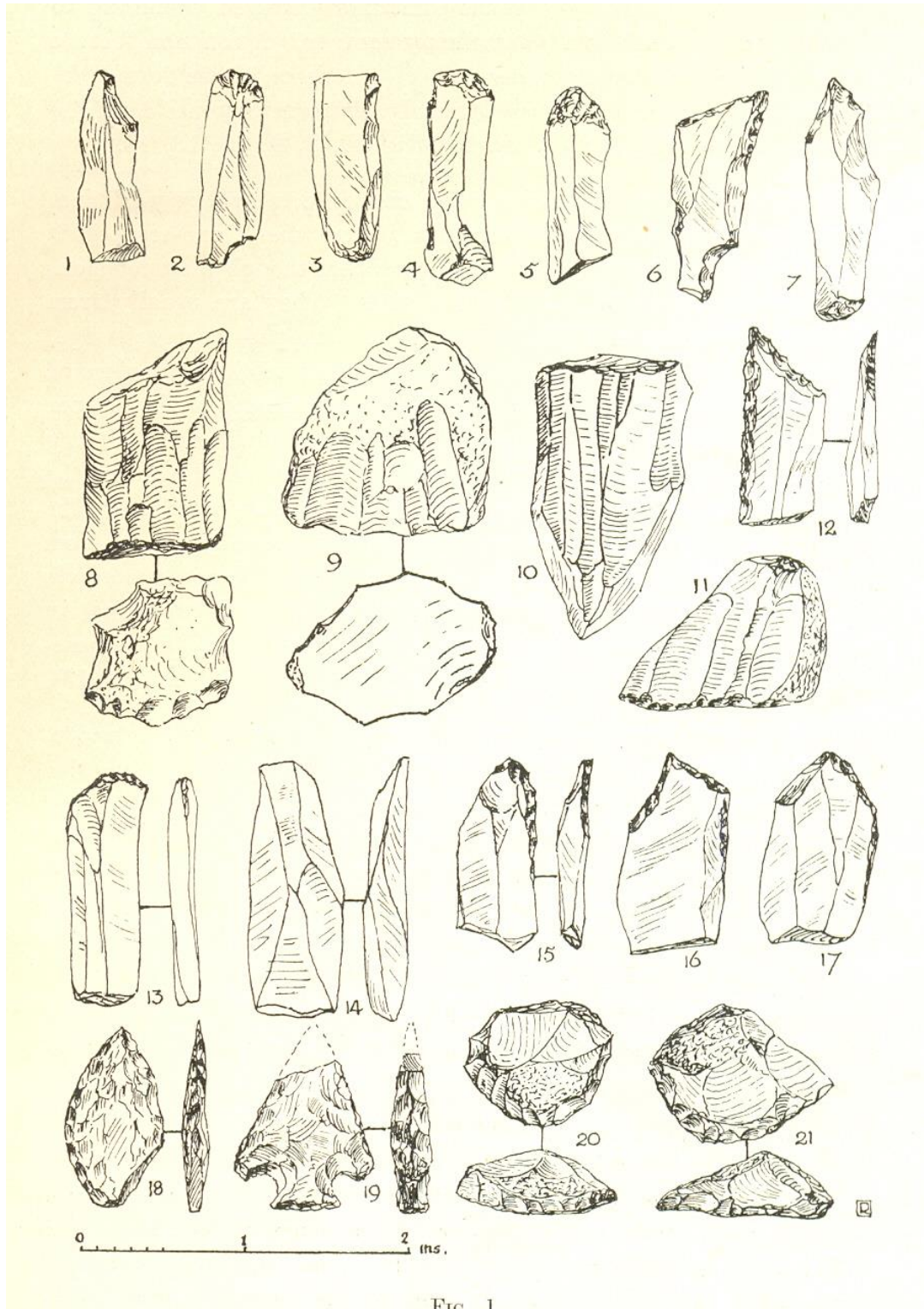


FIG. 1

end in the more conical cores has sometimes received trimming to make a usable though somewhat clumsy scraper. A common feature of the smaller cores is the occurrence of a zone or girdle formed by the breaking off of the flakes at a nearly uniform distance from the end, as seen in Fig. I, 8, 9, 10, 11 j Fig. II, 8, 9, 10, 13, 14.

*Scrapers.*-These can be divided at once into two entirely distinct types, the circular "thumb-scrapers" and the "end-scrapers" made from stout blades. The circular scrapers though least common, are perfectly typical of these coastal sites. They are usually from 3/4 inch to 1 inch diameter and rather thick, chipped to a good edge, very steep, but well shaped, around two-thirds to three-quarters of the circumference (Fig. I, 20, 21). The thickest part of the scraper is at the back, and is in all cases the original bulbar end of a big flake, all the chipping being on the side opposite the bulb, the underside of the scraper being left a single flake surface. The end scrapers are far more varied in form, usually made from blades of quadrangular section, the underside being again a single flake surface, and the end opposite the bulb being rounded in outline, by steep secondary chipping giving a semi-circular or sometimes less curved but convex scraping edge (Fig. I, 2, 3, 4, 5, 13, 15).

*Blades and Points.*-Flakes long in proportion to their width, with relatively thin and flat cross section, which is either triangular or quadrangular, are common, and may have one or both edges modified by secondary chipping. The bulb is usually well preserved at one end, usually the least modified or worked, and the under surface is a single flake surface including the bulb. There is a marked tendency for the blades to adhere pretty closely to one of two general proportions, i.e., width to length about 1 to 3 or about 1 to 1 1/2. They vary in size from "pygmies" to blades 2 inches, or in extreme cases, 3 inches long. Many of the blades are broken off diagonally at the distal end, and the diagonal side as well as the long side worked with secondary chip, to produce a serviceable point (Fig. I, 6, 7, 12, 16).

*"Pygmies."*-These true microliths are perhaps the outstanding feature of the site, and they fall into three distinct groups, each group having some latitude of variation within it. First come a series of small implements with more or less parallel sides, the "rods." These may or may not be roughly pointed. Fig. III, 1-15, illustrate this type in its many forms. The flakes are not

usually more than 3/4 inch long, but the extremes range from 1/2 inch to 1 1/4 inches. The width is seldom more than 3/16 inch, the cross section usually trapezoid .. They have been manufactured from long, thin flakes, by steep secondary chipping on the two parallel sides, the narrow top surface and the whole under surface being original flake surfaces. It is only rarely that any trace of the bulb remains. A second type includes the points and harpoon barbs. The points

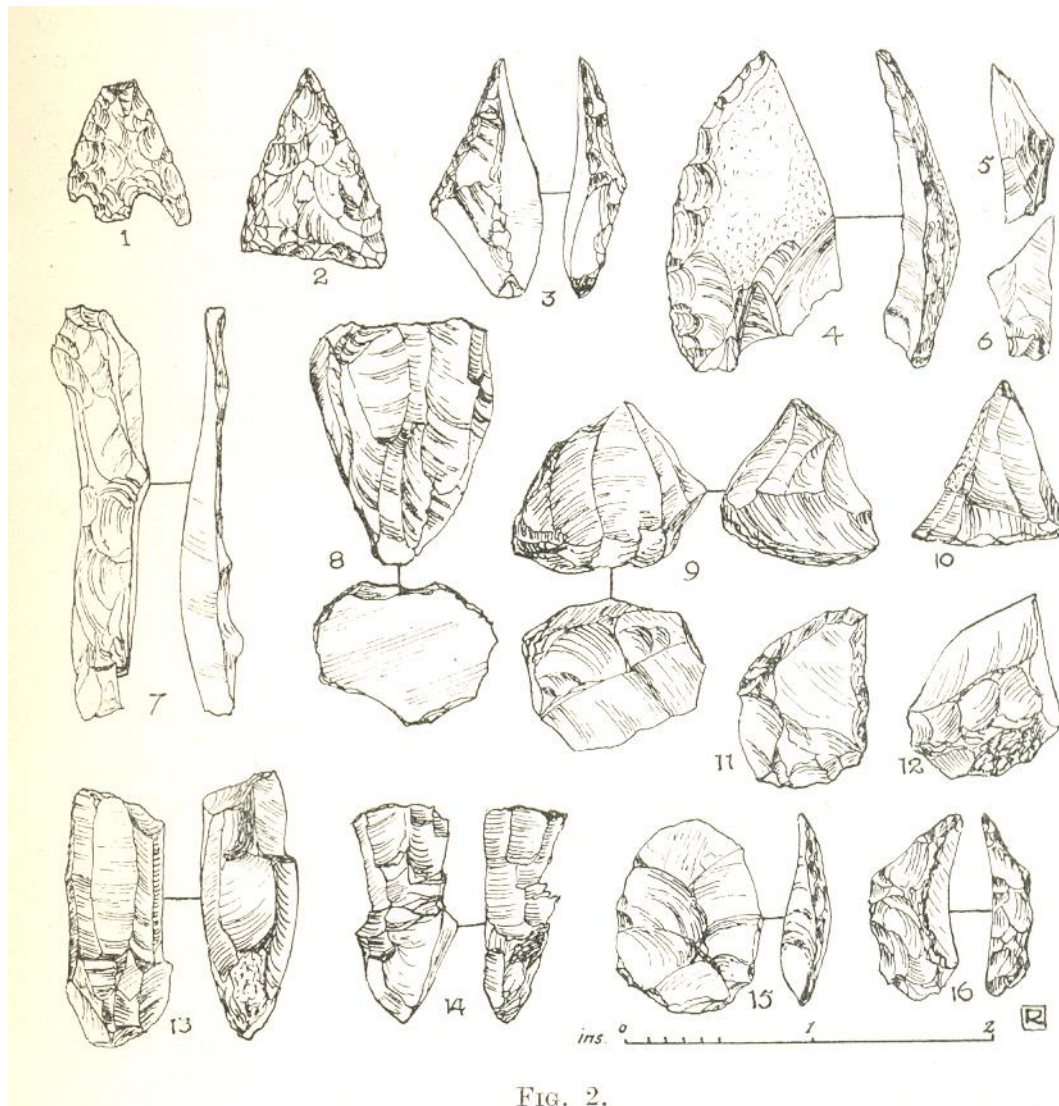


FIG. 2.

are sharply triangular, with chipping along the converging edges, or upon only one edge (Fig. III, 16-21). The barbs are well known and are illustrated (Fig. III, 23-27, 29, 31, 33-35, 37, 40): They vary much in shape, but all agree in having two very unequal sides and a diagonal distal edge; giving a sharply acute angle and an obtuse angle at the fore edge, with a smaller right-angled butt at the other end. The fore edge is usually fully sharpened by secondary



chipping. The third type is that which has received the name "micro-burin," and though generally present, this is the rarest type on the coastal sites. Examples are illustrated in Fig. III, 32, 42, 44.

*Arrow Points.*-These form three distinct groups. First, there are present on this site, as on other coastal sites, a large number of more or less triangular flints that have been sharpened by secondary chipping in such a way as to prove serviceable as arrow points. These are very variable in size, and widely varied in type, in nearly all cases strongly suggesting the attempt to make use of some accidentally fractured flint, often part of a large blade. Occasionally they approach a symmetrical, well-balanced form, but these are rare (Fig. II, 3, 5, 6, 11, 12, 16). The leaf-shaped heads are among the most symmetrical and best worked artifacts from the site. They are all rather more than an inch in length, ovate, and pointed at the fore end, rounded at the bulbar end. The chipping is nearly uniform over both sides, the thickest part being about one-third the length from the butt. The edge is sharpened the whole way round by very fine and regular chipping (Fig. I, 18). One very good triangular point is present (Fig. II, 2), slightly asymmetric, with slightly convex sides. The barbed arrow points include two types, those with very pronounced butt and small barbs (Fig. I, 19), and those in which the barbs are longer and curved, and the same length as the butt (Fig. II, 1). These need no special description, belonging to very well known early Bronze Age types.

While the bulk of this material is seen to be very typical "mesolithic," there is a strong element that from surface sites would be called "neolithic" along with some definitely early Bronze Age arrow points. The excavation of some of the small areas where sand is still covering the site, reveals that all these remains are contained in a few inches of grey sand, under the recognisably different blown sand. This basal layer may either represent an accumulation of dune sand during a relatively short period, or may be a residual from a larger deposit. There is no criterium at present to determine this point. The occurrence of Bronze Age and leaf-shaped arrow points along with microliths is, however, in keeping with other coastal sites in the north-east, and in many inland sites, evidence is accumulating that the microlithic workers arrived so late that Neolithic and Bronze Age were telescoped with



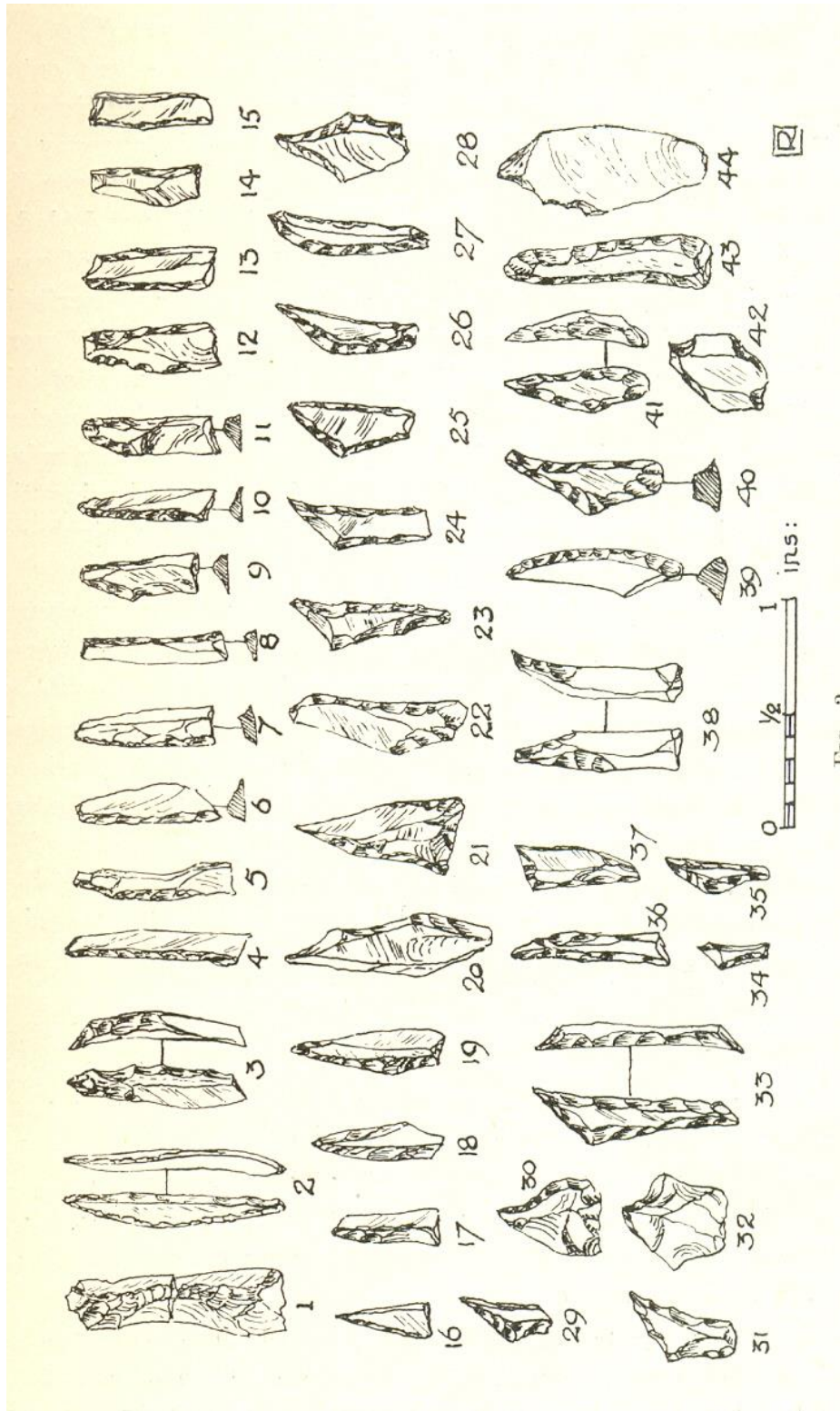


FIG. 3

them into a comparatively short and late period. This is indicated in some of the West Yorkshire caves, where minute flints, Peterborough ware, and Beaker ware, occur in the same level (6).

The abundance of material, and particularly of cores and outer skin flakes of pebbles, suggest that this site was for a long time an actual "factory" site, possibly supplying material to many of the commoner small sites on the coast. These other sites are usually small areas, near the mouth of a dene, where microliths and blades occur in small number, on an old soil level. The percentage of good tools is far higher in these small sites than in the one now described, and in two other similar "factory" sites further north. Of more than 40 sites now examined on the North-East Coast, three are of this "factory" type, the others are of much more occasional character, advantageous fishing points particularly, being marked by a number of tools (mostly broken) on an old soil level, but not having the quantity of chips, often running to thousands, and the high proportion of cores (3, 4, and 2).

The flint used would be imported into the area, and its source is still uncertain. Many of the finest microliths are made of translucent amber or red flint, unlike any common in the northern chalk. There is a high percentage of white flint and some grey. An analysis of the pebbles in the boulder clays of Northumberland and Durham, proves that flint pebbles are extremely rare, and could not by any stretch be invoked to account for the flint used on the sites. The large proportion of clear amber and red flint suggest rather that much of the earliest material was brought by the Tardenoisian people from the Continent, and that only later was the grey and white flint of the English chalk brought into common use. Much burnt flint occurs on this site, and some of it must be credited to the period of occupation, as burnt flints are characteristic of all the sites yet examined, here and on the Pennines. The element of doubt creeps in on this particular site from its character as a popular picnic place, and the site of frequent picnic fires. No trace of hearths or of pottery of Neolithic type has been seen on the site, though only a mile or two along the coast is the site from which Neolithic pottery of Continental affinity has been procured (5).

The microliths of this site correspond very closely with those of other sites on the Durham and Northumberland coasts and are of undoubted late-Tardenoisian affinity. They are paralleled in the late Tardenoisian of the Continent, particularly in the Ensdorf cultures of Germany. In the North of England and South Scotland

this culture is well represented. In North Yorkshire most of the types of microlith got at the Hart site are represented among the collections recorded by Elgee and Crossland. In Scotland the work of Callander in Berwickshire and Lacaille in Ayrshire has produced exactly comparable series of microliths, with, in Ayrshire, a few of the early Neolithic triangular arrow points. This late-Tardenoisian culture is clearly spread along the North-East Coast, at least from Yorkshire to Berwickshire, and across South Scotland to Ayrshire, and all the sites yet recorded in detail fit smoothly into the same picture.

As soon as we cross onto the Pennines, however, a very different story is evident. The microlithic culture of the West Yorkshire Pennines is entirely distinct in character and more clearly related to the earlier Tardenoisian and has Azilian links with the cultures of Derbyshire. This group occupies the Pennines as far as Swaledale, but in Upper Teesdale and Weardale, the very scant micro-lithic remains yet discovered are related to the North-East Coastal types, and not with the mid-Pennines. There is no evidence of contact of these two distinct groups anywhere in our northern area. In both cases, however, the Tardenoisian culture, whatever its original origin and relationships, persisted long enough to have contact with the Neolithic and for its types to be found now, along with perfectly typical Neolithic flints. The relation to the earliest Bronze Age is not so clear, except at three sites, of which the Hart site now being discussed is one. In two cases, the Mesolithic- Neolithic complex has along with it Bronze Age barbed arrow points of early type, while in the other case, microlithic points occur in the same cave earth layer as Peterborough (Neolithic) and Beaker (early Bronze) pottery (6). It is noticeable that at none of the North-East Coast sites yet has any trace of habitation been found, but the discovery recently, by Mr. G. Bennett Gibbs, of a flint site and hearth, a short distance inland from the Hart site, and his continued work upon it, holds promise in this direction. Among a typically rough Neolithic group of flints a few microliths have been found similar to those of the coastal sites, actually associated with the hearth material. It is not possible yet to discuss the hearth material, but a full examination of the site and completion of analysis of the hearth material and soil layers, with the determination of the numerous bone fragments occurring in them, may bring our first light in the district, on the actual domestic sites of these people.

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## THE PSYLLIDAE, OR JUMPING PLANT-LICE, OF NORTHUMBERLAND AND DURHAM.

By GEORGE HESLOP HARRISON, B.Sc., Ph.D.

The present group of the Hemiptera-Homoptera has, until comparatively recently, been neglected by all local workers. Bold, it is true, when carrying out his admirable investigations into our local Typhlocybidæ, and allied groups, did record a few species, but his efforts were baffled by the absence of suitable literature. This remained the state of affairs until just before the war, when Prof. J. W. Heslop Harrison\* and Dr. R. S. Bagnall turned their energies to several neglected insect families, amongst which were the Psyllidæ.

In 1915, the first fruits of their labours were published in *The Naturalist* (Harrison, 1915), in the form of an annotated list of the Psyllidæ of the Cleveland, which contained many references to the species collected in adjoining areas. This was followed in the same journal by a description of a new species discovered by Bagnall, and named *Psylla bagnalli* by Harrison, in honour of his collaborator. Subsequently, records appeared from the pens of both authors in various entomological, and other periodicals, but these practically ceased in 1919. My own investigations commenced in 1930.

During my researches, the work has proceeded at all seasons, revealing the fact that several species have very short periods of adult life. As a result, certain species, especially of the genus *Aphalara*, formerly considered excessively rare with us, appear abundantly in my collections.

Beating conifers in winter has always been considered one of the most productive methods of securing Psyllids, and other methods of obtaining overwintering adults have been comparatively neglected. These I have exploited, thereby discovering that very many Psyllidæ never desert their true host plant, but shelter in winter on its base and lower twigs. In addition, box, broom, heather, dead tussocks of grass, and less frequently, whin and privet, have proved prolific shelter plants.

A knowledge of the Flora, too, has been an invaluable asset, for, by directing special attention to certain plants, Psyllid species,

\* The initials J. W. H. H. and R. S. B., used below, refer to these workers.

usually considered very rare, and generally taken as hibernating adults, have proved common. As an example, I can cite my experiences on a waggon-way embankment near Birtley ; there I have collected from their food plants *Aphalara nebulosa*, the rare *A. pilosa*, and *A. (Anomocera) nervosa* in thousands.

In my lists I have chiefly adopted the classification\* of Crawford (1914) with certain modifications resulting from my own work. This I have done because, in my opinion, the classification employed by Edwards (1908) seems, in some respects, unnatural. Similarly, the latest publication on the Psyllidae (Haupt, 1935) also sets out a system which is unacceptable inasmuch as it neglects Crawford's work and gives preference to Low's based, to an exaggerated extent, on wing venation.

#### HEMIPTERA-HOMOPTERA.

Division: STERNORRHYNCHA

Superfamily: PSYLLOIDAE.

Family: PSYLLIDAE.

Subfamily 1.-LIVIINAE Löw.

Genus LIVIA Latr.

##### 1. *Livia juncorum* Latr.

A local, though widely distributed, species, feeding, and producing its characteristic gall, on many different species of *Juncus*. The pollution and destruction of many suitable habitats about Newcastle no doubt account for its gradual disappearance. Blackhall Rocks and Billingham Marshes (J. W. H. H.), Bradford (Charles Robson), Gosforth Park (Bold), Otterburn Moor (Peet).

Distribution: Europe and North Africa (Algeria), Britain to the Hebrides.

Genus *DIRAPHIA* Illiger.

##### 2. *Diraphia (Livia) crefeldensis* Mink.

A rather rare species but easily recognised by its spotted wings; Newham Bog, plentiful (J. W. H. H.).

Distribution: Local in Central Europe to the Caucasus, North of England.

Subfamily 2.-APHALARINAE Low.

Genus *RHINOCOLA* Forst.

##### 3. *Rhinocola aceris* Linn.

This insect has been recorded from Maples growing in a hedge near Birtley, but in my opinion, it has now been exterminated by the continual trimming of the affected trees. Bewick Main, near Birtley (J. W. H. H.); larvae on Maple, Gibside (R. S. B.).

Distribution: Central Europe, Finland; England to Durham.

\* Aulmanu's Catalogue (1913), too, has proved useful.

Genus APHALAROIDA Craw. (RHINOCOLA Edw., STROPHINGIA Enderl.).

#### 4. *Aphalaroida ertcae* Curt.

Very common on various species of *Erica* and on *Calluna vulgaris*, everywhere on the moors.\* The earlier records (Harrison 1917) indicate that it is rare at Birtley, North Durham, but I find it to be widespread and abundant. The statement (Harrison 1915) that the species is dimorphic on Great Ayton Moor I can now extend to cover the insect wherever I have found it. Not only is it seasonally dimorphic, but, in addition, the sexes are distinct in colouration, and the male is much smaller than the female.

Distribution: North and Central Europe; British Isles to the Hebrides.

Genus APHALARA Forst,

#### 5. *Aphalara calthae* Linn.

Usually very abundant wherever it occurs. I reject *Caltha palustris* as a genuine host plant for this species, although it is often given as such. In an experiment designed to induce the insect to feed on and gall the Marsh Marigold in captivity, no deformation of any kind was produced.

Various species of *Polygonum* and *Rumex* or *Atriplex* are selected as host plants. Eggs have been found on *Polygonum hydropiper*, larvae on *Rumex acetosella*, and hibernating adults on *Coniferae* and low herbage.

Vigo, near Birtley, Hag Wood near Lamesley, Gosforth, Newcastle, Chopwell, Prestwick Carr, Dipton, Lanchester; very probably generally distributed throughout the counties.

Distribution: North and Central Europe, North America, south to California, Japan; Britain to the Inner Hebrides.

#### 6. *A. exilis* Web. & Mohr.

Whilst not so widely distributed locally as its close relative *A. calthae*, this spotted-winged species is none the less very abundant in the immediate vicinity of Birtley, where no less than ten colonies are known, nine on *Rumex acetosella*, and one on *R. acetosa*. The adults hibernate and may be found on low herbage, heather and gorse, etc., Billingham (J. W. H. H.), Lanchester, Dipton, Prestwick Carr, Gosforth Park. Harrison noted one of my Birtley colonies in an early diary, but this is the first time the species has been put on record for the northern counties.

Distribution: North and Central Europe; England, northward to the Inner Hebrides (Raasay) and Aviemore. Rather local.

#### 7. *A.* (Subgenus *Anomocera* Craw.) *nervosa* Forst.

Owing to the fact that this species has nine-jointed antennae, it must be referred to Crawford's new subgenus *Anomocera*. This characteristic feature has been overlooked hitherto. Thus there are now three representatives of the subgenus, two of which are American. The host plant is *Achillea Millefolium*, and the adults may be found on this plant from the beginning of May until August. As the species hibernates low down near the roots of its host as an early stage nymph, the adults are, in general, found on old, well established plants developing much woody material. The banks of the Wear, near Wolsingham

\* Wherever no initials are appended the records are my own. It should be noted, too, that I am solely responsible for the facts relating to the general biology of the insects discussed.--GEORGE HESLOP HARRISON:



(J. W. H. H.), Stocksfield (R. S. B.), also very abundant in many localities near Birtley. Although no other habitats are known at present, this insect should prove to be very widely distributed over the Northern Counties.

Distribution: Europe; Siberia, Asia Minor; Britain to the Hebrides (Tiree and Coli) and Forres.

8. **A. nebulosa** Zett.

Feeding on the willow-herb *Epilobium angustifolium*, this species is very abundant and widely distributed throughout the counties; thus it seems curious that no earlier records exist with us. The adults are to be found in June, whilst the characteristic galls must be sought for in early July. It, too, hibernates as the very young nymph on the roots of the willow-herb. Found wherever its host plant forms well established colonies.

Distribution: North and Central Europe, Japan; Britain to Perth.

9. **A. pilosa** Osh.

An abundant species in the two localities known for it in the northern counties, Greatham, at the mouth of the Tees, and Birtley. In the first the insect is attached to *Artemisia maritima* and was recorded in 1917 (Harrison). At Birtley I found it two years ago on the roots of its host plant *Artemisia Absinthium*. This was in December, at which time the insect was only a very small larva.

Distribution: South Russia, Caucasus; England.

10. **A. picta** Zett.

Recorded from Birtley only. In an early diary of my father's, I find mention of the capture of this rather local species; the host given is "*Hieracium sp.*"

Distribution: North and Central Europe, Siberia, North America; Britain to the Hebrides.

Subfamily 3.-*PSYLLINAE* Löw.

Genus *PSYLLA* Geofi.

12. **Psylla alni** Linn.

A most abundant species; so far I have never examined any well established alder woods wherein it was lacking. There are no indications of the two broods seemingly indicated by the earlier record (Harrison 1915). The characteristic green adults of the early summer are the same, though red and black, individuals of the autumn.

Distribution: North and Central Europe, Japan; Britain to the Hebrides.

12. **P. forsteri** Flor.

The earlier records (Harrison 1915), state that this species in North Durham is just as abundant as *P. alni*. This I have never found to be the case, though there is no doubt that the further north one goes the more abundant it becomes. It may be found in company with the preceding on alder, practically wherever that tree occurs, but much less freely. Neither feed on birch in these counties though they have been taken from it elsewhere.

Distribution: North and Central Europe, Japan; Britain to the Hebrides.

**13.P. buxi** Linn.

In agreement with the two preceding species, the adults seem to be seasonally dimorphic in colouring, but there are not two broods in the year. As in *Psylla alni*, the green adults of early summer change their colouration and become the green and black individuals of the autumn. The larvae produce conspicuous galls, which have been likened to miniature cabbages, on the box shrubs (*Buxus sempervirens*). Most nursery stock is unavoidably infected with *Psylla buxi*, for, at the time of transplanting box, the insect is usually in the resting egg stage, the eggs being laid in the terminal buds. The insect is found almost wherever the box is used as an ornamental plant.

Distribution: Central and Southern Europe, North America (introduced); Britain to the Hebrides.

**18.P. betulae** Linn.

A comparatively rare species in the North of England; recorded twice only from these counties; on birch, Newham Bog, and Wolsingham (Harrison 1917).

Distribution: North and Central Europe, Japan; Britain to Perth.

**15.P. hippophaës** Forst ,

Apparently restricted to the area about Budle Bay. It was said to be very abundant when first detected, though my recent examination suggested that it is now restricted to a few shrubs of Sea Buckthorn. As this plant is propagated by means of cuttings, and as these may carry eggs and young larvae, it seems probable that this rather rare local insect will turn up in such places as the Tynemouth ornamental gardens. Recorded from Seahouses and North Sunderland (Harrison 1917); still in the same locality, though not very abundant.

Distribution: Central Europe, Finland; local in England to Northumberland, Skye (introduced).

**16.P. spartii** Guer.

A common species where it occurs, but nevertheless, local, appearing to prefer very special types of habitat. Living on broom, *Sarothamnus scoparius* the adults are to be found from May until July. In most localities they are strongly sexually dimorphic' in respect to colouring. Blanchlaud and Gibside (R. S. B.), Wolsingham (J. W. H. H.), Ebchester, Dipton, The Sneap, Birtley (Brooms Wood, Dene Wood, Oilmills) and Lamesley.

Distribution: Central and Southern Europe; Britain to the Caledonian Canal.

**17.P. viburni** Löw.

Reported (Harrison 1917) as very rare at Birtley, Durham, on Guelder Rose. This is apparently the second British record of this species; the insect feeds normally on *Viburnum lantana*.

Distribution: Central Europe; rare and very local in England.

**18.P. pruni** Scop.

One adult male taken at Birtley (Brooms Wood) on its host, bullace; more usually the common Blackthorn is favoured. As I have recently taken it in several localities in Scotland, it is obviously not confined to the southern parts of the British Isles.

Distribution: North and Central Europe, Siberia; Britain to Mull.

**19. P. brunneipennis** Edw.

A large species with darkly shaded wings, feeding on various willows and hibernating as the adult. Recorded as occurring sparingly in Durham but commoner at Wolsingham (Harrison 1917), Blanchland on *Salix phylicifolia* (J. W. H. H.), Sharnberry Gill (R. S. B.), Waldrige Fell various *Salix* sp., including *S. pentandra*; Birtley on *S. fragilis*; Chopwell on *S. aurita* and *S. cinerea*; Budle Bay on *S. fragilis*; Chopwell, on Conifers during the winter months.

Distribution: England local; West of Scotland, including the Hebrides

**21. P. ambigua** Forst.

The adults of this species live from May until early August on various species of *Salix*. It is one of the earliest species, but has a very short adult life. Its larvae hibernate at the second instar, and are to be found under the lateral buds on the host willows from September until the following March or April. In many localities in the Northern Counties; so far I have detected it on the following hosts :-*Salix alba*, *S. fragilis*, *S. pentandra*, *S. purpurea*, *S. viminalis*, *S. Andersoniana*, *S. aurita*, *S. caprea*, *S. cinerea*, and various hybrids of these species.

Distribution: North and Central Europe, Siberia, Japan and Greenland; Britain to the Outer Hebrides.

**21. P. abdominalis** M.-D.

This species comes very close to the preceding one in many respects. The failure to differentiate it, has, in the past, been responsible for a great deal of the confusion which exists among the British Sallow-feeding Psyllas. Thus the present is the first time the insect has been listed as British; nevertheless, I find it common in the North of England and the West of Scotland. Chopwell (*S. aurita* and *S. cinerea*); Birtley (*S. fragilis*); Vigo, near Birtley (*S. alba* and *S. fragilis*); Budle Bay (*S. fragilis*).

Distribution: Central Europe; Britain to the Hebrides.

**22. P. dudai** Sulc.

This, too, is an addition to the British lists. On observing it recently amongst my Scottish insects, I carefully examined all the Sallow-feeding species I had from these counties, and as a result discovered that I had taken it sparingly with *P. nigrita*, at Chopwell, but had failed to recognise it; food plant generally *Salix aurita*. Recently, however, a very strong colony was found on Ross Links depending on *S. repens*.

Distribution: Central Europe; Britain to the Outer Hebrides (Barra and S. Uist).

**23. P. nigrita** Zett.

Very similar to the last species in general appearance, but quite distinct. At present it is a more generally understood species, and, therefore seemingly possesses a wider distribution. It may be beaten during the winter months from Coniferae, and during the summer from its true hosts, which are various species of *Salix*. At Chopwell, where I first observed it in these counties, it is completely double-brooded; whether this is universal I cannot say.

Now recorded from *Salix aurita*, *S. cinerea* and *S. Caprea* and from Coniferae throughout the counties.

Distribution: North and Central Europe, Japan; Britain to the Outer Hebrides.

**24.P. melanoneura** Forst.

An abundant species, feeding on hawthorn. It frequents old, well-established trees in waste places; this seems to be the direct result of the preference the adults display for hibernating amongst the tangled masses of grass and low herbage growing round the boles of the trees in such situations. Hibernating adults are likewise to be found very abundantly, practically everywhere.

Distribution: Central Europe, Siberia, Transeaucasia; Britain to the Inner Hebrides.

**26.P. subferruginea** Edw.

The adults may be distinguished from the previous species by their larger size and predominantly orange colouration. There are also distinctive differences in the genitalia, and in the selerites of the thorax. Adults from Coniferae at Chopwell, Ebchester, Lanchester, and Dipton Woods, Corbridge.

Distribution: Great Britain to the Hebrides.

**26.P. bagnalli** Harr.

I find this species to be even more distinct from its close relatives, *P. nigrita*, *P. subferruginea* and *P. melanoneum*, than the original description (Harrison 1916) implies. Since that appeared, only one further locality in Northumberland has been noted for it, although several others are known for it in Scotland. Blanchland Common, on rushes (R. S. B.) Budle Bay on small Junci and on the Sea Club Rush.

Distribution: Local. North of England, Scotland to the Hebrides.

**27.P. pyricola** Forst,

Found only once, in company with *P. mali*. Larvae and adults were sent to me from a garden at Gosforth, Newcastle, and identified as this species. Usually it feeds on pear but it may, as in this case, feed on apple.

Distribution: Central Europe, Japan; North America; Britain to the Hebrides.

**28.P. peregrina** Forst.

In the Cleveland, this species was described as occurring in multitudes on every hawthorn (Harrison 1915), and this is true wherever it occurs. In summer, the insects are mainly green, but, towards the autumn, they turn red and brown; without doubt, the species is univoltine. Eggs may be collected throughout the winter. On every hawthorn in the two counties.

Distribution: North and Central Europe, Japan; Britain to the Inner Hebrides.

**29.P. sorbi** Linn.

Almost as common as the preceding species; limited, however, by the distribution of its host, *Pyrus aucuparia*, the common mountain ash. This

insect, too, passes through a series of colour changes *P. peregrina*, though the adults in the autumnal garb are never so in that species.

Distribution: North Europe, Canada; Britain Hebrides.

**30. *P. mali*** Schmdbg.

Although this species is common enough on cultivated apples, it is very abundant on the Crab. It, too, passes through the same cycle of colour changes as the two preceding insects. Throughout the counties on cultivated apples, but on Crab at Ebchester, Chopwell, Rowlands Gill, and Corbridge.

Distribution: North and Central Europe, Japan; North America (introduced); Britain to Skye.

**32. *P. hartigi*** Flor.

Only recently have I been able to add this form to the Northumberland and Durham lists, although, no doubt, it will prove to be quite widely distributed, now that the time of its appearance (June and July) has been recognised. A number of larvae and adults were beaten from birch on Waldrige Fell last year. Since then I have found colonies at Beamish, Urpeth and in Gosforth Park.

Distribution: Central Europe, Hebrides.

**32. *P. ptarmicae*** Kieff.

Last year (1934) Bagnall, in introducing this species to the British list, drew attention to the fact that the gall produced by the larvae had been noted by him and Prof. J. W. Heslop Harrison on *Achillea Ptarmica* at Langdon Beck. On asking the latter worker for further information. I was told that the galls had also been noted at Allenheads. It will be noted that both the localities given for Northumberland and Durham are of a subalpine character; repeated searches in the lowlands for *P. ptarmicae* have proved fruitless.

Distribution: Central Europe; England.

**33. *P. crataegi*** Schr.

A single female beaten out of a hawthorn hedge near Beamish.

Distribution: Central and Southern Europe; Britain to the Inner Hebrides (Raasay).

Genus ARYTAINA Forst, (ARYTAENA Scott).

**34. *Arytaina genistae*** Latr.

A fairly large species, common enough in certain localities, feeding on broom (*Sarothamnus scoparius*), and the Dyer's Greenweed (*Genista tinctoria*). I have noticed that it is rarely found in company with the other broom-feeder, *P. spartii*. It appears that ecological conditions play an important part in deciding the distribution of these two forms; *A. genistae* prefers sheltered valleys and enclosed areas, whereas *P. spartii* occurs on brooms growing on hot sandy banks with very high summer temperatures.

*A. genistae* has two broods in a year, and the adults hibernate on their host, from which they may be taken almost continuously throughout the year. Hibernated adults, are, as a rule, very much darker in colouring than those of the summer brood. Sexual dimorphism is exhibited in respect to their size and colouring.

Although widely distributed, it is rather local; Minsteracres, Blanchland (R. S. B.), Corbridge and Wolsingham (J. W. H. H.), Birtley, Urpeth, Waldrige Fell, Lanchester, Devil's Water, Dipton, Ebchester, Gosforth Park.

Distribution: Central Europe, North America (introduced); Britain to Elgin and the Hebrides (Coll.).

Genus PSYLLOPSIS Löw.

39. **Psyllopsis fraxinicola** Forst.

A common species feeding on ash, *Fraxinus excelsior*, and its variety *pendula*. The adults do not hibernate, for eggs are laid in summer on the terminal buds, to hatch with their bursting the following spring. Practically everywhere.

Distribution: Europe, East Siberia, North America; Britain to the Hebrides.

37. **Ps. fraxini** Linn.

This, too, is very plentiful on the common ash, often in company with the last-named species. It, however, produces a gall, formed of thickened, inrolled leaves, strongly veined with reddish purple. These galls were observed by the late Charles Robson on Lilac at Killingworth and described to Prof. J. W. Heslop Harrison.

The adults lay their eggs in the same kinds of situation as, but rather earlier than, in the case of *Ps. fraxinicola*; the two appear as larvae more or less simultaneously. Common and generally distributed.

Distribution: Europe, Asia Minor, Palestine; Bribain to the Hebrides.

37. **Ps. discrepans** Flor.

Also feeding on the common ash, and producing a gall very similar to that of *Ps. fraxini*. It has been reported once for the counties; near Wylam (R. S. B.).

Distribution: Central and Northern Europe; Britain to Edinburgh.

Genus LIVILLA Curt.

38. **Livilla ulicis** Curt.

Among other species of this family, Mr. Jas. Murray records in *The Vasculum* the capture of this rare species at Wark, North Tyne, where he swept it from rushes. The identification of this insect was made by Mr. E. A. Butler, who remarks on its rarity.

Distribution: France, Switzerland, Italy, Balkans; Britain, very local and chiefly western.

Subfamily 4.-TRIOZINAE Löw.

Genus TRIOZA Först.

39. **Trioza urticae** Linn.

This is the commonest and most variable of the species of this sub-family. I have noticed that adults wintering on conifers are always darker in colour than those which have spent the winter months on grasses, etc. The insect can produce as many as four generations in the open, and five, or more, in the cold greenhouse. The host plants are *Urtica dioica* and *U. urens*.

Distribution: Europe, Siberia; British Isles.

**40. T. albiventris** Forst.

Widely distributed but never numerous. The host plants are willows of the *Fragilis* group, as a rule, though I suspect that birch may sometimes fill this office, as I have occasionally collected the insect from that tree miles away from any suitable willows. Sparingly distributed throughout the counties.

Distribution: Europe; Britain to the Inner Hebrides.

**42. T. remota** Forst.

An oak feeding species hibernating on Coniferae. The larvae in their early stages produce a characteristic "pit gall" on the leaves of the oak. The adults have been collected from Coniferae at Chopwell, Birtley, Lambton, Fatfield and Hartford Bridge, whilst larvae have been obtained from oak at Lambton and Corbridge; from the latter batch imagines were bred. Bagnall (1915) records the occurrence of a Psyllid larva on oak at Felton; no doubt he is referring to this species.

Distribution: Europe, North Africa, Japan; Britain to the Hebrides.

**42. T. galii** Porst.

Recorded from Birtley in 1914 in my father's diary. I have never seen the species here myself, but galls and larvae have been found frequently further afield; Prestwick Carr, larvae and galls on *Galium cruciatum*; bred from the same plant from North Northumberland; also from Ebchester, Dipton, Winlaton and the Blackhall Rocks.

The insect described as *Trioza velutina* by Forster has been recorded twice for this area, but it is now regarded as nothing more than *T. galii* Porst, restricted to *Galium verum* is the food plant. The *velutina-galii* complex was a point of controversy during Scott's time, and this ended in the merging of the two species. Later, Edwards resurrected *T. velutina* on the grounds of some peculiarities in the wing venation, and the fact that one form fed on *Galium verum* and the other on *Galium cruciatum*. After a careful consideration of all the facts, as stated by Edwards and the earlier workers on the group, I have reverted to the earlier position, and look upon *T. velutina* as nothing more than a well-marked variety of *T. galii*.

Distribution: Central and Southern Europe, North Africa, Siberia, to Formosa; England.

**43. T. chenopodii** Reut.

*T. chenopodii* is a maritime species feeding on *Atriplex patula* and *Obione portulacoides*. It was first recorded for this area under the varietal name *T. atriplicis* Licht. by Prof. J. W. Heslop Harrison (1917); he took it at Greatham near the mouth of the Tees. Although no further localities are known for it in these counties, it is still fairly abundant in its old station. Distribution: Central Europe; local, England to Durham.

**44. T. proxima** Flor.

I have no knowledge of this species except that Bagnall (1915) recorded it from Penshaw Hill, where it was producing its characteristic gall on *Hieracium pilosella*. This is still the only record for the British Isles.

Distribution: Central and Southern Europe; Durham only.



45. **T. flavipennis** Forst. (**T. aegopodii** Low).

Taken once from its host *Aegopodium podagraria* at Stocksfield (J. W. H. H. and R. S. B.). This is the first time the species has been put on record for the British Isles, and it is therefore, not only new for the county, but also for the British lists.

Distribution: North and Central Europe; Britain, Northumberland only.

47. **T. maura** Forst.

Since this species was first collected in Britain (J. W. H. H. and R. S. B.), it had never been noted until early this year, when I was able to obtain a few specimens of both sexes from conifers in Scotland. Recent researches now enable me to record it from similar situations near Hartford Bridge, Northumberland. There is no reason why this insect should be so rare with us in the British Isles, for it enjoys a wide distribution over Europe, and is also indigenous in America.

Distribution: Central Europe, North America; North of England to Perth.

47. **T. centranthi** Vall.

A single specimen obtained by sweeping coarse grass at Hylton, in August (R. S. B.), and another at Birtley (J. W. H. H.).

Distribution: Central and Southern Europe, Transcaucasia; England to Durham; local.

48. **T. abdominalis** Flor.

Gibside, Corbridge on conifers (R. S. B.) This is a very rare and local species in the British Isles, feeding normally on *Alchemilla vulgaris*.

Distribution: Northern Europe; Britain.

49. **T. munda** Forst.

Although included in Edwards' Monograph, and also listed by Scott, this green and black Triozan has not been recorded for the British Isles since the original specimens were sent by Walker and Haliday to Forster. However, quite recently, I captured the species in the Hebrides, and in certain localities on the Scottish mainland. Moreover, I have also found the insect in Dipton Woods, Northumberland. There seven females and one male were beaten from spruce in March this year (1936). In the Hebrides they were likewise obtained from spruce, and at Struan, in Perthshire, from juniper. The true host is *Knautia (Scabiosa) sylvatica*.

Distribution: Central Europe; Britain to Canna, Ireland. Very local.

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