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Journal of the

BRITISH PLANT GALL SOCIETY

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NOTES TO CONTRIBUTORS

Recommended guide-lines, when writers have the facilities:-
Type in double spacing on one side of the paper only. Give margin of 2 cm at upper and left -hand margins.
Include a second (e.g. carbon) copy; a third copy is useful, and writers should also keep a copy.
Give sketches on a separate sheet, in black and white. Indication of scale and any other writing at least 5 cm. clear of sketch(es).
Underline scientific names, and nothing else; use a separate sheet to indicate any other special printing instructions.

Copy should be received by the Editor by end of February/August for publication in May/November. Approximately intermediate dates apply to the Newsletter prepared by the Secretary.
17th June 1988 for all material for Newsletter No. 6, addressed to Dr. C.K. Leach.
31st August 1988 for all material for Cecidology No. 3.2 addressed to Mr. F.B. Stubbs.

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CECIDOLOGY

Vol. 3, No. 1 Spring 1988

Journal of the British Plant Gall Society

Editor — F.B. Stubbs

EDITORIAL

One of the most cheerful signs in the British Plant Gall Society is the flow of reports, questions and suggestions which the members contribute. Its publications, Newsletter and Cecidology thrive on discussion and the airing of readers' views. Any study, however elementary, must start with practical observation in the field or laboratory, or in a jam jar at home. Then will follow the interpretation and prospects of a valid conclusion.

When a statement is heard or read, it may be accepted even if it conceals an unintentional error or omission. The statement may then be repeated and become established in the literature as a piece of fundamental lore. It is important to safeguard the work against this situation by investigating any apparent weakness and by calling upon further opinions. Few of us would dare to claim expertise in all aspects of gall studies, so we need to exchange ideas.

The topic of Winged Twigs on Elm has stimulated much thought and correspondence. Now we are faced with a dilemma, not for the first time! Even the most widely held explanation does not fit all the cases reported, especially as examples of similar growths have been found on maple, blackthorn and liquidambar. The file cannot be closed without a firm conclusion, but there are other calls on the pages of the Society's periodicals. So the best policy would appear to be to accumulate as much material as possible during 1988, for assessment by members willing to take part in tracking down the clues in recent observations and in earlier references. Please continue to send in your reports, specimens, photographs and opinions. Should the final agreed conclusion eliminate any intrusive organism, that would at least throw light on a phenomenon which many of us have met.

Two articles in this present number raise issues which would benefit from further investigation and debate. The hairy domatia which may house mites on leaves, and the incidence of various galls on the willows both call for clarification.

CORRECTION

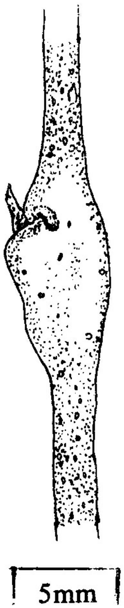
Cecidology 2.2, page 44. The acreage of Skomer was given as "c. 22", when "722" was intended. We must thank Mr. S. Evans of the NCC, Dyfed-Powys region for drawing attention to this error.

A NOTE ON THE GALL CAUSING MOTH LAMPRONIA FUSCATELLA (TENGSTROM) LEPIDOPTERA, INCURVARIIDAE, WITH SOME NEW ESSEX RECORDS

J.P. Bowdrey

The Lepidoptera are poorly represented amongst the British gall causing fauna, and of those species that do occur, several are apparently local and rare. One such species is *Lampronia fuscatella* (Tengstrom) which galls the young shoots of Birch (*Betula* spp.).

The life cycle of *L. fuscatella* is summarised by Heath (1976) who also gives figures of imago and gall. The gall occurs on young shoots up to half an inch in diameter, usually at a node, and between 3 and 5 feet above ground. On reaching maturity at the end of the year the larva makes an exit hole which is sealed with silk and covered in red-brown frass. This is the most reliable way of recognising tenanted galls. Parasitized larvae do not make an exit hole and galls from which the causer or its parasite have emerged have a characteristic circular exit hole.Occasionally two larvae may occupy the same gall and each makes a separate exit. Pupation occurs in April and the moth emerges in May or June.



Heath (1976) also gives notes on the distribution of *L. fuscatella,* which in Britain is widely separated between the Southern Counties, NW England and Scotland. The species is described as local and uncommon.

In 1982-3 Essex was added to the known distribution of this species (Emmet 1985). Old galls were found at Epping Forest and Bedfords Park, and imagines were taken at light in Havering Park. These localities are all in the SW of the County. On the 30. xi. 1986 the author found several empty and one tenanted gall (Figure 1) of *L. fuscatella* on regrowth from a coppice stool of Birch in Belfairs Nature Reserve in SE Essex (TQ8187). Col. Maitland Emmet kindly confirmed the identification and advised placing the gall in an open situation over the winter in an attempt to rear the moth. Despite following this advice nothing emerged from the gall. On the 5.iii.1988 several old galls referable to this species were found by the author on Birch coppice regrowth in NE Essex at Stour Wood,

Wrabness (TM1931), apparently the first record for N. Essex.

It is possible that the apparently widely separated distribution of *L. fuscatella* may be due to its having been previously overlooked.

A search of young Birch in coppiced woodland during the winter months might well turn up the gall in other areas.

The author would like to thank Col. Emmet for confirming the identification of *L. fuscatella* and for additional comments on rearing the moth.

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LOOKING FOR PLANT GALLS

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Whether you are carrying out an ecological survey of galls in a particular area, collecting specimens for the purpose of studying the life cycle of the gall-causing organism in the laboratory, or simply seeking to increase your collection of gall specimens, the golden rule is to dress comfortably when looking for plant galls since galls are to be found most commonly in the lanes bordering fields, woods and country hedgerows and this means that the cecidologist must be prepared to walk for sometimes considerable distances — possibly under adverse conditions.

It is necessary to know precisely where to find galls, for instance on stems, branches and the underside of leaves but, in addition, gall hunting requires a keen eye due to the diminutive size of many galls.

Once the galls have been spotted, they must be identified if the undertaking is to prove worthwhile. Identification is accomplished by using a key which takes into consideration the identity of the host plant as well as such characteristics of the gall as approximate size, shape and the fine detail may be studied using a hand lens, and, to a certain extent, colour although the latter is not widely used since colour tends to be rather labile. An example of this is the changing colour of the common Spangle Gall, *Neuroterus quercus-baccarum* where the galls are red when young and brown when mature.

Sometimes an irregularity is seen in the distribution of the galls such as the finding of galls on only one side of a tree. In order that this information may be interpreted with respect to differences in microclimate, a Continuous Line Transect and an Offset Map may be made and therefore it is helpful to carry a compass and tape measure. In addition, a written description of the gall's surroundings proves useful.

Sampling procedures include cutting off infected stems and shaking galls from the leaves of the host using a beating tray, which may be improvised using an opened umbrella.

It is important, however, to realize that the duty of the naturalist is conservation and so any samples taken must be small lest the breeding population should be seriously depleted. Great care must be taken that the galls' habitat is not disturbed by the damaging of plants whilst taking samples. When the specimens are rare, a permanent record may be made, in the form of photographs or drawings of the galls.

RECORDING PLANT GALLS

At the Society's field meeting in Outwoods, near Loughborough, on Sunday, 4th October last year, the committee met during the lunch time break and among the subjects discussed was that of recording plant galls on a national basis.

It is well known that for many years active cecidologists have been keeping records of the galls that they found. It is reasonable to assume that they shared those records with other naturalists and with their local natural history societies. However, the absence of any national society or organisation willing or able to co-ordinate those records has meant that there has been no national recording scheme, and very few covering particular counties.

When the B.P.G.S. was founded it wa presented with a great many important issues. One of these was the production of a key to plant galls so that interested naturalists would be able to identify most of the galls they found. This led to the production in a remarkably short period of time of the "Provisional Keys", and a most successful publication it has proved to be. Now that we have the "Keys" the next logical step is to set up a national recording scheme.

Ideally we would have liked to have been able to begin recording nationally on the basis of the one kilometre square. Such a scheme is impossible without it being entirely computer based, and there being the necessary people to enter all the records that come in. It was finally agreed that we should start with a ten year period during which records would be made and stored with ten kilometre square references. The chairman pointed out that for most of the country there were few or no records at all, and that a national coverage of 10 Km. references for most plant galls would represent an important achievement.

To make the society's national recording scheme as efficient as possible it was agreed that there should be a recorder for each of the different groups of gall causers. The two largest groups are the diptera and hymenoptera, and it was felt that it would be better if from the start of the recording scheme these two groups' records were kept on computer. Fortunately, Peter Shirley specialises in the hymenoptera gall causers and has already set up a computer database for the oak Cynipids; see his article in `Cecidology', volume 2, No.1. Peter accepted the responsibility for keeping the records of all hymenoptera galls. I, too, have a computer with a large storage capacity, and am willing to be responsible for all diptera gall records. Recorders for other groups will be announced as soon as we have the necessary volunteers.

Records sent in should include the following information:-

Gall Name; Host plant; Causer
Position of gall on the plant. 10 Km. Square:
Vice County; Name of the locality of the record;
Date; Name of Recorder

The 10 Km. square reference should include the two letters indicating the 100 Km. square plus the two numbers for the 10 Km. square; for example, SK14. All names of localities must be those that can be found on an O.S. map. There have been many examples of old records being listed for a site or a locality, that may have been well known locally but was not on any map and can't be traced today. We must ensure that all our records will be of use to future generations of naturalists and must, therefore, be exact enough to be checked against a present day O.S. Map.

It is, I believe, essential that all records sent in should be either printed or typed. There will be quite a lot of work entailed in entering the records. There will not be enough time in which to try and read many different styles of handwriting.

The period covered by our first national recording scheme will be a decade starting in 1990 and ending in the year 2000. However, both Peter and I are willing to accept records starting this year; these records will help us to set up and test our databases.

Another important question is how frequently we enter a particular 10 Km. square record into the computer. It will be a major task to enter a single record for each gall in each 10 Km. square. To enter repeat records for each year of the recording period would be quite beyond us, we would have neither the time or computer capacity. This means that once a particular gall has been recorded for any square it will not be entered again for that square during the period of the recording scheme.

Once records have been entered into Peter's or my computer, it is likely that some members will want copies. The cost of paper, printer ribbons, photo-copying and postage will need to be covered, so a charge to cover costs would have to be made. This cost has not yet been calculated, and it is likely to increase each year as the size of the print-out from the database grows in size.

Peter's and my addresses are given on the back cover of Cecidology. We both look forward to hearing from you and receiving your records for the next ten years.
Happy hunting!

John A. Pearson

BLENNOCAMPA PHYLLOCOLPA

John A. Pearson

Yes, they have changed the name of this gall, which is listed on page 5 6 of the "Provisional Keys" as *Blennocampa pusilla.* It is the gall on the leaves of wild rose in which the two sides of the leaflet roll downwards towards the mid rib, forming a tube like gall which sometimes twists about its long axis.

I often find numerous galled leaflets lying close together on the same branch. The galls are caused by the sawfly, *Blennocampa phyllocolpa,* and yet examination of individual galls often fails to reveal any sawfly larva, or evidence of it having been present.

Do we have here a reaction by the rose leaf to the insertion of the female sawfly's ovipositor that is similar to that of the Salix leaf when the sawfly, *Pontania proxima,* inserts its ovipositor but does not lay an egg? It is known that in the case of *P. proxima,* the red kidney bean gall develops even though an egg has not been inserted.

It is highly unlikely that two quite different agents are producing exactly the same effect on the leaves of the wild rose. So, do we in future record B. *phyllocolpa* only when we find sawfly larva present within a gall? Or do we record the galled leaflet, even though we can find no larva present within it?

A NOTE ON THE GALLS AND DOMATIUM OF LAURUS NOBILIS IN BRITAIN

B.M. Spooner

Laurus nobilis L. (Bay Laurel) is an evergreen shrub or small tree which is popular as an ornamental and valued for its aromatic leaves. It is widely grown in suitably mild areas of the British Isles. Though native to Asia Minor, it is extensively naturalised throughout southern Europe and the Orient and introduced to many other areas of the world.

Bay Laurel is host to comparatively few phytophagous invertebrates, at least in the British Isles, though scale insects are common pests. Only two gall-causers have been recorded on this host in Britain. One of these, the popularly-termed Bay Sucker (*Trioza alacris* L., Homoptera) is common and readily identifiable by the discoloured, rolled and thickened leaf margins which it induces, particularly on young plants, in late spring and summer. This species is often damaging to the host tree, causing browning of leaves and leaf fall, and the galls may also be severely disfiguring. The gall-mite *Eriophyes malpighianus* has also been recorded from Britain (Bagnall & Harrison, 1917). This occurs on the flowers, which become markedly. swollen, with all parts enlarged and thickened and the whole covered by fawn-coloured hairs. The mite appears to be rare in this country, though may be overlooked as the greenish-yellow flowers are borne in small, rather inconspicuous axillary clusters and formed in spring. It is a widely distributed species, known from the Mediterranean region, Africa and Asia.

Also commonly present on *Laurus* leaves are tiny, often hair-covered pits or depressions which occur on the lower surface in the axils of the midrib and main veins and are regarded as a form of domatium. Domatia are characteristic of many woody dicotyledonous plants throughout the world, but their nature and function is little understood. They occur, by definition, only in leaf vein axils and take a variety of forms, although three main types are recognised: hair tufts, pits and pockets. Pocket domatia, for example, are not uncommon on leaves of *Crataegus monogyna*. Domatia frequently harbour mites, or occasionally other invertebrates, and the term `domatium', meaning house or shelter, was introduced to describe what was their assumed function. However, the presence of the mites appears to be opportunistic and the true origin and function of domatia remains obscure.

Various functions, such as extra-floral nectaries, have been postulated but not substantiated. Domatia have also been regarded as leaf galls, and certainly many examples of undoubted axillary galls such as those of *Eriophyes axillare* on *Alnus* and *E. exilic* on *Tilia* can be cited. However, this suggestion is now generally discounted. True galls may differ structurally from domatia and furthermore, some plant species, notably coffee, possess domatia which are known to be present throughout the development of the plant, even when grown from seed in sterile conditions and are certainly a normal part of the anatomy. Nevertheless, there is a possible relationship between galls and domatia. The observation that `mites preferrably attack domatia to form galls' has been made (Jacobs, 1966) and, indeed, all species which have axillary leaf galls also have domatia, e.g. *Alnus* and *Aesculus* spp. The possible origin of domatia as galls which have since become part of the host anatomy is also an interesting hypothesis.

The question remains as to whether all structures now considered as domatia are correctly interpreted. The domatium of *Laurus nobilis* is of interest from this point of view. It was one of the first to have been studied (Lundstroem, 1887), but has received little recent attention as far as I am aware. It is almost invariably present on Laurus bushes and I have yet failed to find a single specimen from which it is absent, although Lundstroem reported its occasional absence. It occurs onLaurus throughout the British Isles, and indeed throughout the range of the plant. Similar domatia also occur on leaves of *L. azorica* from the Azores. However, it is remarkably variable in abundance and inconstant in distribution on the leaf blade. Some plants have few domatium-bearing leaves, and, when present, domatia may occur in many or in only a single vein axil on any given leaf, and have an irregular distribution on the leaf blade. This inconsistant development of some other, but by no means all, domatia, as it is also of plant galls. Three further characteristics exhibited by the domatium on *Laurus* leaves may also be expected of plant galls. Firstly, domatia are not present in seedlings and, secondly, it was shown by Lundstroem that domatia disappear from Laurus bushes when these are grown indoors in mite-free conditions. Finally, examination of fresh, well-developed domatia has revealed the presence of eriophyid mites active amongst the hairs which roof the depression. This observation has subsequently been confirmed by J.P. Bowdrey (pers. comm.). Abnormal hair development is a frequent character of galls caused by eriophyid mites, either in the form of an erineum or as tufts in vein axils. The gall of *Eriophyes hippocastani* on *Aesculus hippocastanum* is a good example of the latter as also are those cited above. However, it must, of course, be noted that many species of Eriophyidae are free living and do not cause galls, and the mere presence of such mites does not prove a gall origin for the domatium. Nevertheless, these points in combination do seem to suggest that it does have some relationship with gall-mites which might repay further study, and be of interest to cecidologists. The identify of the eriophyid which occurs amongst the hairs of the domatium would also be of interest.

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ANDRICUS KOLLARI / LIGNICOLA

Peter Shirley, West Bromwich.

The article in `Cecidology' Vol. 2. No.2. about the above species raised a number of interesting points. The following comments are offered as a contribution to the debate.

The authors remarked that they were unaware of any detailed English description of *A. lignicola*. Such a description was published in the `Entomologist's Gazette' in October 1974. The author was John Quinlan. A short key intended as a supplement to the one in the Royal Entomological Society's Handbook on Cynipids was included. This related to *A. solitarius* / *corruptrix* / *kollari* / *lignicola*. Another key is given to the agamic generation galls which covers *Trigonaspis megaptera* / *A. quercustozae* / *kollari* / *lignicola* / *corruptrix*. Quinlan remarks that `*A. corruptrix* / *kollari* / *lignicola* agamic galls are all readily distinguished.' I have no knowledge of *A. corruptrix* wasps or galls, but have never really understood the confusion which some authors have indicated thet have experienced between *A. kollari* / *lignicola* galls. To me they are very different. My understanding is that the galls of *A. quercustozae* / *gallaetinctoriae* (amongst others) are much closer in form to the gall of *A. kollari*. Should these species (and the others mentioned by Leach and Stubbs) also be brought into the debate?

Quinlan's key separates *A. kollari* / *lignicola* agamic forms as follows: Carinae of propodeum bowed outwards in the middle; scutellar foveae deep, not widely separated; head, thorax and gaster with long dense pubescence. Scutellar foveaea black, deep and obscured by long pubescence of the mesoscutum, not widely separated; scutellar foveae, metanotum entirely, propenduum medially and gaster dorsally black; remainder of head, thorax gaster yellow or yellowish brown. Scutellum broader than long with reticulate-rugose sculpture and long scattered hairs kollari

Carinae of the propendeum bowed outwards in the middle; scutellar foveae more widely separated; head, thorax and gaster with scattered shorter pubescence. Scutellar foveae deep, clearly visible and not obscured by pubescence; scutellar foveae red to reddish chestnut, metanotum medially, propendum and gaster dorsally black, head, thorax and sides of gaster reddish. Sculpture on the scutellum rugose with scattered hairs not obscuring the sculpture. Scutellum as broad as long ....lignicola

Having 2 *A. kollari* and 2 *A. lignicola* agamic wasps to hand I have examined them in relation to the above characters. (Or at least those which I could easily perceive). The 3 most easily compared were the proportions of the scutellum, degree of pubescence, and colour of the foveae.

Proportions of scutellum. The 3 *kollari* wasps had the following measurements (using a graticule): 5 : 3.5 / 5 : 3.5 / 3.25 : 2.5. The 2 *lignicola* wasps were 3.25 : 2.75 / 3.75 : 3.25. This broadly agrees with Quinlan, although the small *kollari* is very close to one of the *lignicola*.

Degree of Pubescence. 2 *kollari* and 1 *lignicola* had about the same degree of pubescence, midway between 1 kollari which had the most, and the other *lignicola* which had the least. Within this tiny sample not a reliable feature.

Colour of the foveae. This exactly fitted Quinlan's description. All the *kollari* were black and both the lignicola were chestnut.

I then considered some other points in relation to the two species. Leach and Stubbs pointed out that there is a behavioural difference between them, concerning the exit of the adult wasp. This does seem to me to be significant. The position of the exit hole in *lignicola* galls is noticeably constant. So marked is this feature that most observers are aware of it – I don't know if the same applies to *kollari* although I have seen many more of that species' galls. It certainly is not a striking feature in relation to *kollari*.

Next I examined some data I have on emergence dates. In general *kollari* seem to emerge between August and November whilst lignicola emerge in May and June. This is a generalisation concerning galls kept indoors, but it may indicate another difference in behaviour. Variation in emergence times is of course a well known phenomena in this group.

Finally I compared the parasite / inquiline cohorts of the agamic gall of each species. *Kollar*i is host to 15 Chalcids and 6 Cynipids, *lignicola* is host to 1 Chalcid and 2 Cynipids (in Britain and Europe). *Lignicola's* solitary Chalcid is *Mesopolobus tibiaiis* – not one of kollari 's 15. Curiously though this Chalcid does occur in galls of the sexual generation of *kollari*. Both the Cynipids found in *lignicola* galls are found in *kollari* galls. *Tibialis* is found in a number of other Cynipid galls, especially those caused by *Neuroterus* species. Is there any significance in its apparent preference for *lignicola* galls over *kollari* agamic galls?

As I said at the beginning I offer these observations as a contribution to the debate. I believe we are still at the stage of posing more questions than we are answering.

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A NOTE ON THE ROLE OF SPANGLE GALLS IN THE ENERGETICS OF QUERCUS SPP.

By C.K Leach
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INTRODUCTION

The structural complexity and diversity of forest communities provides many niches for exploitation by populations of insects which may influence the productivity of a forest. The literature emphasises the obvious pest species and although quantitative data may be available for these obvious pest species, the apparently non-economic species receive much less attention. One such group is the gall forming hymenopterous insects. A view commonly expressed (Connold, 1909; Swanton, 1912; Darlington, 1968) is that the relationship between host plant and gall-causer is frequently so nicely balanced that observable damage to the colonised plant is the exception rather than the rule. Gall infestation is, however, a common phenomenon and it is assumed that the host would be better off without its gall community since the relationship between the two operates in favour of the insects. The plant undoubtedly loses material in forming the gall which otherwise would be of value to its general metabolism.

This study is primarily concerned with the small disc or button-shaped cynipid galls on the two native British oaks *Quercus robur* and *Quercus petraea*. These galls, collectively referred to as spangle galls, develop on the lower surface of oak leaves in Autumn. The insects which produce them are the larvae of the agamic generations of the genus *Neuroterus* (Askew, 1962). The four British species which form them are:- *Neuroterus quercusbaccarum* (common spangle gall); *N. numismalis* (silk button gall); *N. tricolor* (cupped spangle gall) and *N. albipes* (smooth spangle gall).

MATERIAL AND METHODS

This study was undertaken in 1982-84 at sites in Norfolk and Cumbria. At each site, trees under 10 metres in height were elected to facilitate picking of leaves. Details of each tree are given in a Table 1. Gall frequencies were measured by examining leaves collected from each tree before the galls finally matured. Samples were collected at random, leaves being picked singly, starting at the bottom of the trees and working consecutively up and down (Askew, 1962). Mature galls were collected soon after leaf fall by sifting the leaf litter and top soil in random 1 metre squares around the base of the trees. Mature galls were dried to constant weight and their calorific content determined by bomb calorimetry. Respiration data for mature galls were obtained by use of a Warburg respirometer. Reliable data for immature galls were difficult to acheive for, although in the latter stages of development galls could be mechanically removed from leaves, young galls either became detached with part of the leaf or part of the gall remained attached to the leaves. At these stages, it is difficult to distinguish the leaf gall boundary although care was taken to reduce this possible source of error to a minimum. Respiration studies were carried out at the mean ambient temperature, at the time of collection.

RESULTS

The density of galling by the four major *Neuroterus* species on the oak trees under study during 1982-84 are recorded in Table 1. The predominant gall-forming species at the Norfolk site was *N. numismalis* although considerable numbers of galls produced by *N. quercus-baccarum* were also present. The remaining two species *N. albipes* and *N. tricolo*r were also present but at much lower densities. This pattern is similar to that observed on young Oak trees in Wytham Wood, Berkshire during 1958 and 1959 (Askew, 1962). In contrast, *N. quercus-baccarum* was the predominant species in the Lune Valley, Cumbria. *N. tricolor* was absent from all the trees under study in this area, although the author has observed galls induced by this wasp in Cumbria. There were considerable annual variations in gall densities and a pattern of higher density of galls on young trees rather than on older trees was repeated at both sites.

The mean dry weight of galls indicated that the average size of galls produced were site and season dependent as well as species specific. In contrast the calorific values of galls of *N numismalis* and *N quercus-baccarum* on a Kcal/gm basis are virtually independent of species, season or site, values ranging from 4.75 to 4.83 KcaVgm. A calorific value of 4.79 Kcal/gm was used in subsequent calculations. Using this figure together with figures for gall frequency, the mean dry weight of galls and the mean area of leaves from each site; the total standing crop of galls/cm2 of leaf for each tree have been calculated (Table 2). For certain samples of galls of *N tricolor* and *N albipes*, mean dry weights and calorific content were not determined since insufficient galls were collected to obtain meaningful estimates. An estimate of the calorific content of these samples was made using values obtained with alternative samples. since these types only represent a small proportion of the total gall crop, the likely error incurred in the evaluation of the total energy content of the standing gall crop is likely to be insignificant.

The long generation time and the variability of weather and other physical conditions presented difficulties in acquiring accurate data for the metabolic energetics of gall development. The approach used was to determine the rate of respiration and respiratory quotent (RQ) of isolated galls at 20 day intervals during gall development up to the stage of detachment from the leaves. Since galls are poikilothermic, they do not function at the same rate throughout the growth period and the mean air temperatures were used to determine respiration rates at each stage. The determinations yeild an estimate of 1050 ul of oxygen, consumed during the development of a gall of *N. quercus-baccarum* and 705 ul of oxygen consumed during the development of *N . numismalis*. For both gall types the RQ was 0.97-1.03 at all stages of development. Since the RQ is known, the calorific value of this respiration can be calculated. Thus for *N. quercus-baccarum*, the metabolic energy consumed for gall development was 52. cals/gall and for *N numismalis* 3.5 cals. It must be recognised that the metabolic energy of gall development based upon the respiration of detached galls is likely to be too low, since energy will be consumed elsewhere in the plant during the synthesis and transport of precursors for gall development.

DISCUSSION

In this communication, the energy content of the standing crop of spangle gall of oak and the metabolic energy linked to this gall development has been determined for two sites during the period 1982-84. Applying the figures reported

Table 1 The Densities of Spangle Galls on Selected Oak Trees during 1982-84

SITE	Tree	Type	Height (meters) July 1982	Age(1972) years	Status	Gall densities (Number/100 leaves) 1982 B	1982 N	1982 T	1982 A	1983 B	1983 N	1983 T	1983 A	1984 B	1984 N	1984 T	1984 A
	a	Qr.	2	5	Young trees	495	842	28	81	693	979	83	43	401	243	70	5
Norfolk (Thorpe-next-Haddiscoe)	b	Qr.	2.7	7	" "	258	891	0	35	880	698	7	45	302	301	75	12
	c	Qr.	2.7	8	" "	172	1081	48	32	108	89	43	49	0	0	93	19
	d	Qp.	3.4	8	" "	382	871	0	103	601	601	0	41	901	185	0	4
	e	Qr.	8.0	?	Old, stunted trees	172	41	0	62	195	89	0	78	89	41	0	0
	f	Qp.	8.0	?	heavy with ivy growth	301	43	3	48	42	61	0	41	57	105	0	8
	g	Qr.	1.2	3	Young trees	289	78	0	0	489	183	0	0	1091	105	0	0
Cumbria (Kirkby Lonsdale)	h	Qp.	2.5	6	" "	403	53	0	0	890	111	0	10	832	122	0	18
	i	Qr.	3.5	9	" "	471	0	0	2	591	53	0	7	891	83	0	37
	j	Qr.	8.0	?	Young, vigorous	185	6	0	1	298	48	0	3	698	381	0	41
	k	Qr.	9.3	?	Old, light ivy cover	76	45	0	0	58	2	0	0	49	45	0	48
(Casterton)	l	Qr.	2.5	5	Young	49	180	0	5	489	193	0	16	932	1481	0	18
	m	Qr.	9.5	?	Old	108	47	0	0	101	33	0	18	180	185	0	5

Qr. = Quercus robur
Qp. = Quercus petraea
B = Agamic galls of Neuroterus quercus-baccarum

N = Agamic galls of Neuroterus numismalis
T = Agamic galls of Neuroterus tricolor
A = Agamic galls of Neuroterus albipes

Table 2. The Energy Content of Total Standing Crop of Spangle Galls of <u>Neuroterus spp</u>: on Selected Trees

Site	Tree	Total Standing gall crop (cals/cm^2 Leaf area)			Total energy consumed in gall production (Standing crop + metabolic energy (cals/cm^2 leaf area))		
		1982	1983	1984	1982	1983	1984
Norfolk (Thorpe-next-Haddiscoe)	a	5.20	6.29	2.71	6.52	7.95	3.43
	b	4.04	6.17	2.46	5.08	7.78	3.15
	c	4.69	1.14	0.48	5.91	1.43	0.62
	d	4.0	4.52	2.26	5.02	5.72	2.88
	e	0.98	1.20	0.51	1.23	1.54	0.66
	f	1.55	0.81	0.69	1.98	1.10	0.92
Cumbria (Kirkby Lonsdale)	g	1.43	2.60	5.06	1.82	3.30	6.42
	h	1.77	3.96	3.87	2.25	5.04	4.91
	i	1.84	2.60	3.77	2.36	3.30	4.78
	j	0.83	1.37	4.38	1.06	1.78	5.49
	k	0.40	0.30	1.63	0.52	0.39	2.09
(Casterton)	l	0.65	2.46	6.81	0.86	3.15	8.68
	m	0.60	0.50	1.55	0.78	0.65	2.01

in RESULTS, the yearly energy consumption cm of leaf for the synthesis of the agamic galls of *Neuroterus* sp. have been calculated (Table 2). This annual energy consumption for the trees under study showed a maximum of 8.7 cals/cm2 of leaf. The leaf area index (leaf area : ground area) for these trees was 4-5 and the total incident solar radiation during the growing season (May-September) was estimated to be approximately 25,000 cal/cm2 ground area. The efficiency of solar energy fixation by oak leaves is uncertain but bearing in mind figures (less than 1%) derived from studies with similar plants some estimate of the total fixed energy channelled into spangle gall production can be made. In this study, the values obtained indicate that more than 15% of the total fixed energy may be diverted to gall formation. Further considerations must be given to the early necrosis of the leaves around the base of the galls (Askew, 1962) to the shading of the leaves by galls (Connold, 1909, Swanton, 1912) and the severely restricted number of chloroplasts in the gall tissues (Hough, 1953) which together will reduce the efficiency of the energy harvesting by these leaves. Furthermore, in conditions of particularly heavy infestations of leaves with gall densities, as high as 22 *N. numismalis* galls/cm2 (equivalent to approximately 400 cals/cm2) (Askew, 1962), all the energy requirements for such crops cannot be drawn from the infested leaves alone. Accordingly material has to be drawn from elsewhere in the plant. These figures suggest that the gall-formers may significantly reduce the productivity of a forest site. It remains possible, however, that since young trees are particularly vulnerable to attack, the commercial productivity of a forest site would be increased through killing weak and suppressed trees in over dense stands.

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EXOBASIDIUM GALLS ON AZALEA

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The fungus *Exobasidium vaccinii* causes enlargement, pink to red colouring and distortion into oval saucer-shapes of bilberry (*Vaccinium myrtillus*) leaves. The undersides of these tufts of noticeably distinct bilberry leaves are white with the basidiospores of the causative fungus (BPGS Provisional Keys to British Plant Galls, page 73).

There are, however, forty species in the fungal group Exobasidiales. The most well-known species is *Exobasidium vexans* which causes the very trouble-some Blister Blight of Tea wherever the crop is grown. Where Azaleas are grown, likewise, E. japonicum occurs and it is usually economically serious in glasshouse-grown azaleas, causing galls, again white with the basidiospores of the fungus, but all over the gall, as distinct from the leaf sympton on *Vaccinium*. Newsletter No. 6 also quoted references traced by Mrs. Tiller and Dr. Spooner.

PARASITOIDS OF THE SEXUAL AND PARTHENOGENETIC GENERATIONS OF

Andricus quercuscalicis (Burgsdorf, 1783); Hym.: *Cynipidae*

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It is now possible to add more information to that given by Shirley (1987), in his survey of insects other than gall-causers, that might be expected to emerge from the galls of cynipid wasps. In the course of research on the Knopper gall wasp *Andricus quercuscalicis*, a number of species of hymenopterous parasitoids have been reared from galls of both the sexual and the parthenogenetic generations.

The parasitoids of the sexual generation were reared from galls collected from Wytham Woods in Oxfordshire, grid reference SP4508, on the 16th of June 1987. The galls, which are foupd on the catkins of the Turkey oak *A. Quercus cerris* (Linn.), were collected soon after anthesis. At room temperature the gall wasps emerged mostly within two weeks after collection and the parasitoids mostly emerged in the third and fourth weeks after collection.

The parasitoids of the parthenogenetic generation were reared from galls collected from Clayfield Copse near Reading, grid reference SU7277, in the winter and spring of 1987. The galls, which are the characteristic Knopper galls which grow from the acorn cups of the Pedunculate oak *Quercus robur* (Linn.), were collected after the acorns had been shed from the trees in September when they could be easily gathered from the ground. Highest densities of these galls were found under mature trees which had large numbers of acorns, and were near to trees of *Q. cerris*, the host of the sexual generation. Within 20m of *Q. cerris* trees galling rates of 50-100% were found with gall densities on the ground at 100-300m., from 20 to 150m galling rates dropped greatly to 10-60% with ground densities of 10-100m., and from 150-400m, the limit of the survey, all galling rates were below 30% with ground densities less than 40m. Under laboratory conditions, some of the gall wasps and the chalcodoid parasitoids emerged from their galls within a month of collection. Dissection of remaining galls showed many gall wasp imagines, pupae and larvae were still alive up to a year after. Similarly most of the ichneumonid parasitoids had not emerged up to a year after and a number of dead imagines were found on dissection of the galls.

In addition to the three species of *Mesopolobus* attacking the sexual generation which Shirley notes, there are at least five other species of parasitoid attacking the parthenogenetic generation, (see table 1). These have all been noted previously from this host in the British Isles, although there are no widely published records. The five species include two more *Mesopolobus* species, the eurytomid *Sycophila bigutatta* which is easily distinguished by the black discal spot on the forewing, and the two ichneumonids, *Gelis formicarius* and *Mastrus castaneus*. In this study, however, the torymid *Torymus cyaneus* Walker, recorded from the parthenogenetic generation by Martin (1982), was not encountered.

TABLE 1

Hymenopterous parasitoids of the sexual and parthenogenetic generations of *A. quercuscalicis* and their attack rates;

Sexual generation	(sample size 756 galls)	% attack rate
Pteromalidae	*Mesopolobus xanthocerus* (Thomson)	9.9
	M. fuscipes (Walker)	5.4
	M tibialis (Westwood)	0.7
Parthenogenetic generation	(sample size 861 galls)	% attack rate
Pteromalidae	*M. amaenus* (Walker)	3.4
	M. jucundus (Walker)	0.7
Eurytomidae	*Sycophila bigutatta* (Swederus)	0.1
Ichneumonidae	*Gelis formicarius* (Linnaeus)	3.0
	Mastrus castaneus (Taschenburg)	0.7

An interesting problem that needs resolving is the apparent difference between the parasitoids attacking the parthenogenetic generation of *A. quercuscalicis* in the British Isles and on the Continent. According to Collins, Crawley and McGavin (1983), eight species of parasitoid are known to attack it on the Continent: This article lists five species which are known to attack it in the British Isles. Of these however, only the species *Sycophila bigutatta* is common to both lists even though most of these species occur in both regions on other hosts. The reason for this difference is unclear although it is possible that it is due to a lack of records.

A noticeable feature of the Mesopolobus species reared from *A. quercuscalicis* is their unusual sex ratios. This has been previously noted by Collins et al (1983), for the three species reared from the sexual generation. In this case they noted distinctly male biased ratios; *M tibialis* showed a male bias while *M. fuscipes* and *M. xanthocerus* were entirely male. This has been confirmed here by further rearing experiments except for *M. tibialis* where the results were inconclusive, and contrasts with the distinctly female biased ratios found for *Mesopolobus* species reared from the parthenogenetic generation. These ratios are shown in table 2.

TABLE 2

Sex ratios of *Mesopolobus* species bred from *A. quercuscalicis* galls.

Species	Male	Female
From sexual gall	(sample size 756 galls)	
Mesopolobus xanthocerus	75	0
M. fuscipes	41	0
M. tibialis	2	3
From parthenogenetic generation	(sample size 861 galls)	
M. amaenus	1	28
M. jucundus	0	7

This may be because the ovipositing female *Mesopolobus* alters the sex ratio of her eggs to produce an optimum number of male and female progeny from hosts of a particular size. Sex determination of eggs is by haplodiploidy: The female controls fertilisation of the eggs, diploid fertilised eggs become females, haploid unfertilised eggs become males. The mean fitness of females from larger hosts is relatively greater than that of males from larger hosts and relatively less in smaller hosts. This is because female fecundity is closely related to host size, whereas male mating success is not so closely related to host size. Thus ovipositing female parasitoids will tend to bias the sex ratio of their eggs towards females in larger hosts and towards males in smaller hosts to maximise the overall fitness of their progeny. For further details see Charnov (1982).

Mesopolobus amaenus and *Mesopolobus jucundus* females which oviposit on the parthenogenetic generation of *A. quercuscalicis* would be expected to lay mostly female eggs since this host is relatively large. That this host is relatively large, compared to these parasitoids may be shown by dissection of galls containing these species: *M. jucundus*, the larger of the two species consumes about two thirds of the *A. quercuscalicis* larva and *M. amaenus* consumes even less of its host. In at least three cases of galls containing this species the hosts had developed as far as adults although none emerged. Conversely *M. xanthocerus*, *M fuscipes* and *M. tibialis* females which oviposit on the sexual generation of *A. quercuscalicis* would be expected to lay mostly male eggs since this host is relatively small. These parasitoids consume almost all of the host larva and the adult parasitoids are only marginally smaller than the host adults.

Mesopolobus species reproduce sexually and not parthenogenetically and so for those species where only one sex is reared from *A. quercuscalicis* there must be alternative hosts from which the opposite sex may be reared. This seems not to be a problem as *Mesopolobus* species are known to be catholic in taste, attacking a wide variety of cynipid galls at different times of the year. See Askew (1961) for a study of the genus.

In conclusion it may be said that there is now a number of parasitoids that are defmitely known to attack the parthenogenetic generation of *A. quercuscalicis* in the British Isles. Of these the species of *Mesopolobus* have strongly biased sex ratios which may be explained as a response to host size. It is unlikely that this explanation is applicable to *Gelis formicarius*, of which only females were reared, as it is probably thelytokous. Any additional information on A. quercuscalicis or its parasitoids would be gladly received.

Acknowledgements are due to my supervisor Dr. G.C. McGavin (Oxford University Museum), also to Dr. M.G. Fitton and Dr. Z. Boucek (British Museum Natural History)) for help in identification of parasitoids.

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ELMS WITH WINGS

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Readers of your article **Winged Twigs on Elm** (Cecidology Vol. 2 No. 2.) might be interested in the following references.

In a Canadian work, Hosie (1973) says of the Rock or Cork Elm (*Ulmus thomasii*) that its twigs are "slender, becoming strongly ridged with corky bark". His photograph of this feature shows cork wings closely similar to those observed on English Elm (*U. procera*) in Great Britain. Indeed, regarding the latter species, which is introduced in Canada, he goes on to say that "some forms of English Elm resemble the native Rock elm, but the leaf shows several of the main lateral veins forking, whereas the Rock Elm leaf rarely shows any forked veins".

Femauld (1950) also describes cork ridging in *U. thomasii* and *U. procera*, and indicates that *U. alata* is even more conspicuous in this respect because the cork forms on younger twigs. Krussman (1984) further emphasises that its twigs are "glabrous and usually with two wide opposite corky wings (!)"

Surprisingly, however, the standard British floras Clapham et al (1962 and 1987) make no reference to twig alation in *U. procera*.

Under the heading "Woody Shoot Malformations," Buczacki et al (1985) say that such occurrences "may cause concern, although none is harmful." As an example they explain how "deeply ridged bark in young shoots, also known as winged cork, is common on Field Maples and on Elms, especially as hedgerow plants.". Certainly my own observations reveal frequent if not almost prevalent alation in Elm hedgerows around London, but I would hesitate to accept the term "malformation", or to assume, as Mrs. Boyes perhaps did in 1983, that it is a prime causer of stem die-back.

On the contrary, the above references reveal a wide international acceptance of this phenomenon in the Elm family, and they support (without proving) your concluding theory that it could well amount to nothing more ominous than a normal transitional growth stage between the smooth twig and the rugged bole.

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DIVIDED VIEWS ON WINGED ELMS

An article in Cecidology (Vol. 2 No. 2 page 33) on Winged Twigs on Elms, served to stimulate further reports of the occurrence of this phenomenon. Central to the discussion on Winged Elms is whether or not this is truly a gall phenomenon or a normal transitional development from smooth twig to rugged bole. This debate is further complicated by the description of "winged" structures on *Acer* and *Prunus*. For example, Leslie Pinkess of Edgbaston, Birmingham who has sent in a slide of *Prunus spinosa* displaying winged structures analogous to those on Elms. Nevertheless, the preponderance of literature referring to winged or flanged elms tend to imply that the condition is to the plant rather than to be the result of attack by a gall causing agent. Here are reproduced two contributions to the debate.

Winged Elms – Mr. A.O. Chater, Botany Department, British Museum, (Nat. Hist.) Cromwell Road, London. SW7 5BD. Writes:

I have always assumed that the flanges on elm twigs were entirely natural to the trees concerned; I suppose because they seem to grow out at a more-or-less constant thickness and thus appear to be produced by a cambium close to the main part of the twig rather than a distant cork cambium. There is a reference to this phenomenon in the encyclopaedic book Elm by R.H. Richens, Cambridge (1983), pages 10, 95 and 278). This author says the Dutch Elm *Ulmus x hollendica rim hollenica* has the greatest tendency to produce the flanges. He adds that, in other species, the character is strongly influenced by environmental factors, particularly by salt-laden winds. Richens does not mention the possibility that the flanges may be a form of galls. He also refers to an article on cork-barked elms in the Gardeners' Chronicle and Agricultural Gazette (1855 p.790) by T. Rivers.

THE PLANT GALLS OF EXMOOR NATIONAL PARK

J.A. Hollier & A.M. Hollier

In 1954, 265 miles of Exmoor, on the Devon-Somerset border, was designated as a National Park. The central moorland plateau is cut by deep valleys which often support ancient woodland, and bounded to the north by the sea. The area is rich in habitat types, and comes somewhere between the Upland and Lowland regions of Britain. In 1974 the Exmorr Natural History Society was formed to study and record the flora and fauna of the Park, and during the European Year of the Environment a provisional checklist was compiled (Giddens, Bristow and Allen, 1988). A number of gall forming insects were included, but some were inadvertantly omitted and mites were not listed. Wilson (1986) had already listed some galls from the region. The following list is more complete, species not found in the check list are indicated by an asterisk; the nomenclature follows Stubbs (1986).

Although 60 galls have been recorded it is clear that this is a great under estimate of the true richness of the area. Many are single records and most from the area around Minehead. In particular the gall fauna of native plants is under-represented, and further recording in the more central areas of the National park is desirable. The field meeting in September (see programme) should add valuable information.

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GALLS ON FORSYTHIA

Brian Wurzell

Darlington (1968) illustrates two stem malformations on Forsythia. Plate 239 shows fasciation (broadening and flattening of the stem); Plate 240 shows irregular bulbous swellings with dense clusters of buds attached. The author states that these two features are associated, and that both probably indicate galling by the bacterium *Corynebacterium fascians*.

Observations in North London (London Borough of Hackney) have revealed that many Forsythia bushes are heavily infected with cluster-bud swellings but show no trace of fasciation at all. This raises the question whether the two malformations are indeed caused by the same agent; their co-existance on the same stem is, of course, no guarantee of it. Fasciation as such is a phenomenon widely observed in plants of very different genera, and usually of herbaceous nature; its rare, sporadic, non-colonial occurrence is not particularly indicative of attack by a parasitic organism of external origin. The swellings alone are much more likely to be bacterially caused.

We should keep an open mind, too, on the identity of the host plants quoted in our limited cecidological literature, especially when those plants are of alien and/or hortal origin. Darlington assumes that *Forsythia suspensa* is the host in this case. Although we shall never know on which Forsythia this gall was first detected in Great Britain, there is no question but that the common Forsythia of urban and rural gardens is a hybrid between *F. suspensa* and *F. viridissima*; it is known as *F. x intermedia* and is normally represented by the floriferous form `Spectabilis'. It is highly probable that the "epidemic" of gall infection which Darlington observed in parts of the U.K. is affecting this taxon more than any other.

REFERENCE

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QUESTIONS AND ANSWERS

Galls on White Bryony (Newsletter No.6.)

Brian Wurzell's question on the identity of the agent which causes the hardening, bunching and swelling of the terminal shoots of White Bryony (*Bryonia cretica* spp. *dioica*) brought a swift response from Dr. Lloyd-Evans of Huddersfield. Dr. Lloyd-Evans referred to the "Galimuchen and ire galls auf Wildfflanzen" by M. Shuhrava and Dr. Vaclau Shuhrava in the Neva Brehm Buchera; senas Wittenberg, Lutherstadt, 1963. This text provides a photograph of the gall and says of the gall "Sie verursachen Gallan, die von verdichten and gerhrausalten Blattern and verdichter Achse gebildat werden. In der Galle, die bis 3 cm. brait ist, leben harven von *Jaapiella bryoniae* (Bouche), die sich auch dort verpuppen". Dr. Lloyd-Evans also points out that the Gallenboek also mentions galls by *J. bryoniae* and adds a second gall causer (*J. paroula* – Liebal) which attacks flower-buds of white Bryony.

Coleosporium-like orange rust pustules

Members are asked for the identity of orange rust pustules on Petty Spurge (*Euphorbia peplus*) and Alexanders (*Smyrnium olusatrum*). The former of these was found on Tottenham Marshes, North London, while the latter was spotted at Hastings.

Salix Galls (Newsletter No. 6) – and the problem with species

A very clear message has been received from several sources that we should all **attempt** to identify the host when reporting galls on *Salix*. Clearly there will be many problems with some galls – particularly with those in which the gall-causer has not been identified. Mr. Chater of the British Museum draws our attention to a very thorough BSBI Handbook on willows with keys, illustrations of species, hybrids etc. The Handbook entitled "Willows and Poplars of Great Britain and Ireland" BSBI Handbook No. 4. 1984 ISBN 0 901 158 07 0 is obtainable from F. & M. Perring, 24 Glapthorn Road, Oundle, Peterborough, PE8 4JQ. for £6.75 including postage. As Mr. Chater says there should really be little excuse for anyone not, at least, trying to identify any willow. He does, however, agree that we should still have to maintain a "rag-bag" of "*Salix* sp." records for those whose identity cannot be fully traced. The production of a British Check-list currently in hand will undoubtedly help with some of the difficulties.

Related to this is the "species" status of galls on a variety of hosts caused by a single gall causer which should be classified as a single species would appear to have a simple answer. In the words of one correspondent "We would not classify polyphagous non-gall causing organisms any differently". The question is, however, not that simple. Consider a gall-causer which induces two different galls on two different hosts. Clearly the gall-causer must be regarded as a single species – but what of the galls. Should they be treated as a single entity when the galls (and their causers) on each host type are capable of independent existence. In essence the problem begs the question which takes precedence in the classification of a gall, the host or the causer? The problem is particularly difficult where the full host range of the gall-causer is not known and is particularly acute amongst Salix and amongst galls caused by nematodes.

A Record from the Isle of Wight

Dr. David Biggs recently sent a leaf of *Quercus ilex* which had scattered patches of "brown felt" on their under surface. Under the microscope the "felt" had the typical appearance of *erinea* and amongst the hairs were undoubtedly Eriophyiid mites. The usual searches amongst Buhr, Darlington and the Provisional Keys drew a blank. However, a search in "Les Zoocecidies des Plantes d'Afrique, d'Asie et d'Oceanie" C. Houard, Paris 1922, came up with a description which fits – *Eriophyes ilicis*. We are unaware of any actual records of this species in Britain, but it does appear in F.A. Turk's Check List of British Mites. Any further records of this mite would be welcome; so, too, would word of any other gall on holm oak.

No British book on galls mentions Quercus ilex, nor do Buhr's work or Gallenboek. Presumably that is because the tree is an introduced species in Northern Europe; as a native of the Mediterranean region, it is included by Houard, having a different range of galls from those on our native oaks. If a gall is seen on *Q. ilex*, we will attempt to trace its identity, especially if a specimen can be sent.

(Surely the holm oak, established here in some places, has a claim to inclusion, like sycamore or walnut? – Ed)

BOOK REVIEWS

OAK GALLS OF ESSEX by J.P. Bowdrey.

Pp. 28, A4 Size. Colchester and Essex Museum. £2.

This study reveals one small corner of the plant gall world, but it also introduces the whole subject in a style which will be widely appreciated. The galls of oak and the organisms which cause them – usually gall-wasps – include some conspicuous and widespread examples. They form a neat group which makes a fine starting point for the beginner and teasing problems for deeper research.

A preface leads to keys for the identification of oak galls, illustrated by very clear line drawings. Then follows a description of the field characteristics of each gall and its causer, alongside a map of Essex, with its two vice-counties, VC18 and VC19. The 10-Km. squares indicate the distribution and, as so often happens, suggest districts which would repay a visit. The author acknowledges the help of others on the preparation of this monograph, whose publication should inspire a flow of additional records to add to the maps. We look forward to hearing more from Jerry Bowdrey and the Essex team, and echoes from other counties.

Oak Galls of Essex may be obtained from:-
Colchester and Essex Museum, Museum Resources Centre, 14 Ryegate Road, Colchester, Essex. CO1 1YG. Remittances payable to the Museum. £2.00 post free.

The Flora and Vegetation of County Durham by G.G. Graham. Pp. 530. Durham Flora Committee & Durham County Conservation Trust. £30.

Twenty years ago local naturalists, and eminent botanists from elsewhere, were first invited to assist in this project. The outcome is one of the most comprehensive studies of its kind, in which the Rev. Gordon Graham has paid full attention to sub-species and natural hybrids as well as to bryophytes and lichens. Distribution in VC 66 is shown on maps, together with assessments of changes revealed by reference to reports dating back over three centuries. The factors of geology and meterology are explained, while the treatment of over a dozen of the County's habitat types, from salt marsh to Pennine uplands, includes species lists for each. No aspect of botanical or ecological significance has been overlooked and it is not surprising that the work should fill over 500 large pages, very neatly printed and bound.

Orders may be sent to to Mrs. Myra Bumip, 38 Langholm Cresecent, Darlington, Co. Durham, DL3 7SX. Remittances for £32.75, to include postage, payable to "Durham Flora Project".

F.B.S.

INTRODUCTION TO THE 1988 SEASON

Details of arrangements are given on the Inside Back Cover. These notes are a pre-view of each event.

The Society is indebted to the Regional Co-ordinators and other members who have made the plans, and greatly appreciates the hospitality offered by Societies, Trusts and Institutions on these occasions.

Willsbridge (23 July): An Outdoor Centre of the Avon Wildlife Trust, set in the countryside between Bristol and Bath.
Grass Wood (3 September): This Reserve in Wharfedale, owned by the Yorkshire Wildlife Trust, is famous for both plants and insects. Plant Galls are usually a feature of the September meeting of the Entomological Section of the YNU; it is hoped this year to add to the list resulting from a similar visit in 1975.
Malmsmead (10th September): The Malmsmead Centre is in the Doone country of Exmoor, and we look forward to meeting the Exmoor Natural History Society. J.A. and A.M. Hollier send word of recent work on the Plant Galls of Exmoor National Park, and it seems likely that 1988 will see additions to the present lists.
Stover Country Park (11th September): This small corner of the original Stover Estate lies on the edge of the Dartmoor National Park. A large central lake with developing alder can is surrounded by areas of heathland, mature conifer plantation laid down during the period of Forestry Commission ownership and also a wide variety of frondose trees which should prove interesting to the Cecidologist. Leader Pauline Ivimey-Cook.
University of East Anglia (18th September): The University lies on the outskirts of Norwich in grounds of richly varied habitat. There is a pleasant picnic area as well as a comfortable lounge for those who prefer to eat indoors. Laboratories will be opened for our use, the equipment including stereo microscopes. We have to thank Dr. Roy Baker for making these arrangements.

Sandwell Valley (25th September): This extensive oasis is overlooked by the motorways M5 and M6. The area today has rich habitats for the fauna and flora, besides reflecting social history. The local naturalists and municipal authorities, with help from national sources, have ensured its survival. Members of the Sandwell Valley Field Naturalists' Club have contributed illustrations, papers and very pleasing species lists to produce a comprehensive 90-page handbook, "Wildlife of the Sandwell Valley". copies at £3.80, including postage, are available from Peter Shirley, 72 Dagger Lane, West Bromwich, B71 4BS – cheques payable "SVFNC".
Marske-in-Swaledale (25th September): A small tributary of the Swale runs among limestone crags, mixed woodland and pasture land. The meeting is arranged by the Darlington and Teesdale Naturalists' Field Club, following up John Pearson's recent lecture at Darlington.
Groby (2nd October): Martinshaw Wood is managed by the Woodland Trust; it forms the southern bounds of Charnwood Forest, and covers some 250 acres with both broad-leaf and conifer stands. Members are invited to take their lunch to the Leicestershire Museum at New Walk, in the City, and then to inspect the substantial collection of galls in the afternoon.

Attractive sites may be owned or managed by individuals, private estates, conservation bodies, local authorities, and so forth. In many cases they take an active interest in the wild life of the area, and appreciate reports and species lists from naturalists who visit. The BPGS is glad of any such material for its Geographical Distribution files.
The Woodland Trust has expressed the specific wish to be in touch with this Society. The sites which it owns or manages number over 200, and access to the majority is offered at any time. Members of the BPGS living near to a W.T. holding, or planning to visit, could benefit from having a word with the local W.T. officer, often a mine of information on the fauna and flora. Enquiries may be addressed to the Woodland Trust,

Autumn Park, Dysart Road,
Grantham, Lincolnshire, NG31 6LL.
(Tel: 0476-74297)

It is not too early to be considering the 1989 programme. The BPGS would like all members, as far as possible, to find it convenient to attend a meeting occasionally – say every two or three years at the worst. So please send in your suggestions.
At this stage, approximate ideas will serve – e.g. Month and County. Perhaps you may know of a Society or a Field Centre willing to help with arrangements; if not, our Secretary has an effective system!
So far, as mentioned in Newsletter No. 6, there are proposals for 1989 meetings on the Isle of wight and, for a week-end at Preston Montford near Shrewsbury. Large areas never yet covered by a BPGS meeting include:- Wales (North, Central or South); Chiltems; Cotswolds; Counties south of the Thames and east of Dorset; North West England, from Cheshire to Cumbria.

F.B.S.

PROGRAMME 1988

Sat. 23 July: Willsbridge Mill (ST 664 706) on the A431 between Bristol and Bath. Avon Wildlife Trust.
Field Meeting from 11.00 a.m. then at 2.30 p.m.
ANNUAL GENERAL MEETING
Formal Resolutions for discussion at the AGM must be received by the Secretary in writing with signatures of Proposer and Seconder, by 30 June. Questions, problems and sugggestions may be raised on the day, to be referred to the Committee for early consideration if approved.

Sat. 3rd Sept.: Grass Wood (SE 984 652) on minor road 2 km. north west of Grassington at 11-00; parking very limited. Details - John Pearson. Yorkshire W.T./Y.N.U.

Sat. 10th Sept.: Malsmead Centre (SS 792 478) off the A39 road, Minehead-Lynmouth. with Exmoor NHS; details and maps from the Secretary, CKL. Leader - John Hollier.

Sun 11th Sept.: Stover Park, 10.30, or 2.00 for afternoon only; bring packed lunch for full day. Indoor facilities for cup of tea or if weather becomes inclement. Details and maps from Pauline Ivimey-Cook, with members of the Devonshire Association Entomological Section. Meet in left-hand car park, SX 831 750.

Sun 18th Sept.: University of East Anglia, School of Education. A workshop style meeting, commencing 11.00; grounds can be explored before that time. Bring packed lunch. Entrance to the University (TG 194 083) is off the B 1108 Norwich - Hingham road, just outside the Norwich Ring Road. Details - Rex Hancy.

Sun 25th Sept.: Sandwell Valley, West Bromwich. Meet 10.30 a.m. at the Park Farm Centre. Bring lunch. Leader Peter Shirley; in association with the Sandwell Valley Field Naturalists Club.

Sun 25th Sept.: also Marske, near Richmond, N. Yorks., with Darlington and Teesdale Naturalists Field Club. meet 1.30 p.m. at the bridge in Marske village (NZ 103 004).
Leader - Barry Hetherington.

Sun 2nd Oct.: Martinshaw Wood, Groby (SK 511 067) Parking at Groby Community College. By car from the South continue on Ml to Junction 22 (with A50, Leicester-Ashby-de-la-Zouch) then SE towards Leicester, after c. 5 km. turn right into Groby. This avoids suburban roads. Lunch at The Leicestershire Museum, New Walk, Leicester. From lunch into the afternoon.
Leader - Chris Leach.

Further details of any meeting from the Hon. Secretary, Dr. Chris Leach, or from members named above.

BRITISH PLANT GALL SOCIETY

AIMS: To encourage and co-ordinate the study of Cecidology, with particular reference to the British Isles.

MEMBERSHIP SUBSCRIPTION: £5 p.a. (Family Rate £8)
to receive CECIDOLOGY twice yearly;
Newsletters and Notices as issued;
Concessionary rates in circumstances where a charge is necessary.

All members are invited
To submit papers, reports or announcements to the Editorial Committee;
To seek advice or information through the Society.
These terms apply equally to Individuals, Societies and Institutions.

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Midlands: Mr. P.R. Shirley, 72 Dagger Lane, West Bromwich, B71 4BS. (021-525-1143).

Scotland: Mr. A.P.Bennell, Royal Botanic Garden, Edinburgh, EH3 5LR. (031-552-7171 ext. 313).

Wessex: Dr. Lena K. Ward, I.T.E. Furzebrook Research Station, Wareham. Dorset. BH2O 5AS. (09295-51518/9).

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Please address correspondence to the Secretary, OR for specific purposes, to the officer concerned.