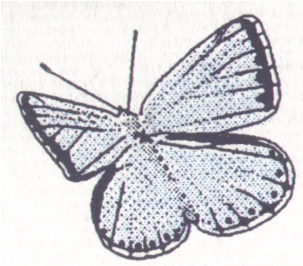

HERTFORDSHIRE AND MIDDLESEX BRANCH NEWSLETTER

ISSUE 35 SEPTEMBER 2003

AUTUMN

BUTTERFLY CONSERVATION SM

Butterflies Galore...

by Gavin Vicary

It certainly seems to me to have been a very good summer for butterflies. Perhaps the most pleasing aspect from my point of view has been the large numbers of Small Tortoiseshells that I have seen this year after poor numbers in previous years.

The huge number of Painted Ladies this

year has also been good to see. I visited the RSPB reserve at Dungeness, Kent in July and there were literally thousands of Painted Ladies on the reserve. At one point we had over one hundred of them on the heads of a small clump of thistles just in front of us which made a very spectacular sight. I had thought that the good weather might have encouraged some Clouded Yellows over from the continent as well but unfortunately I haven't seen any.

I also visited Watlington Hill in Oxfordshire and Blean Woods in Kent this year. Heath Fritillary had just emerged at Blean and there were plenty of Silver-spotted Skippers at Watlington which was a butterfly I had not seen before. The Red Kites and spectacular views at Watlington Hill also make this a very worth while place to visit.

Thankyou to everyone who has sent me Small Copper records this year. A large number of people have contacted me with these records and it certainly looks as though the good weather has helped boost Small Copper numbers.

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We now have four cattle on our Millhoppers reserve. This should greatly help with the management of the site and give a more traditional way of maintaining things - It will also be a lot less hard work than cutting and raking! John and Margaret Noakes have done a huge amount of work raising funds and organising contractors in order to bring this about and it is good to see their efforts rewarded in this way.

Hertfordshire & Middlesex Branch of Butterfly Conservation

Annual General Meeting

Saturday 17th January 2004

at the Welwyn Civic Centre
Prospect Place
Welwyn
Herts AL6 9ER
Grid Reference: TL232160 [Map 166]
(map on next page)
Time: 2 for 2.30pm - 5.30 pm

Guest speaker DR. TOM BRERETON
Butterfly Conservation's Monitoring and Species Ecologist

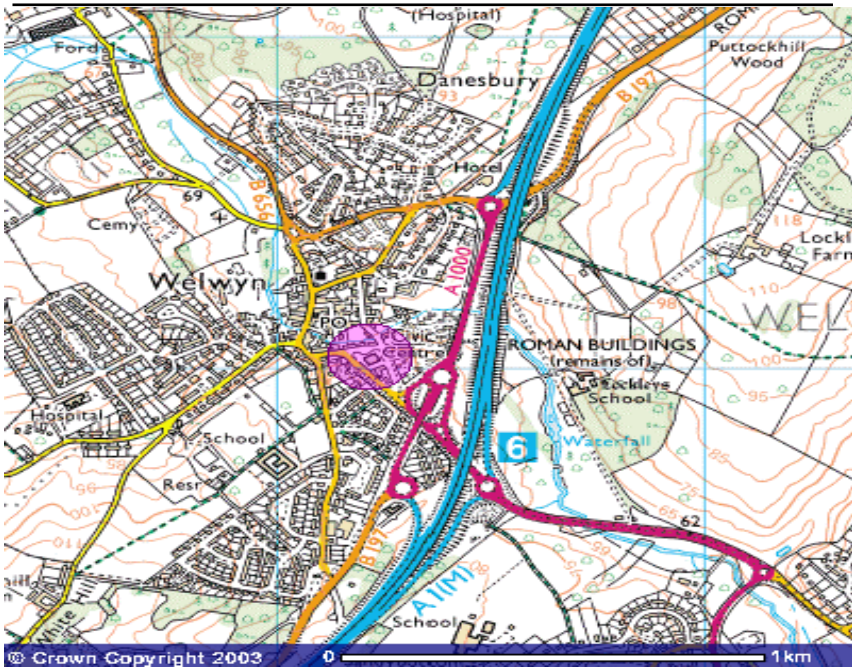
Full programme to be confirmed in the next newsletter
A lift will be available from Welwyn Garden City Station

The Sales and Plant Stand will be present
Refreshments will be available

The committee has decided this year to change the format of the Annual General Meeting from a weekday evening event to a Saturday afternoon. We hope this will prove successful and that more people will feel able to come. Tom Brereton from Butterfly Conservation has kindly agreed give a talk probably on Transect Recording.

The committee have not agreed the final programme as this newsletter goes to print but full details will be available in the next newsletter and on the branch website http://www.hmbutterflyconservation.org.uk/ when confirmed

If members want to come by public transport, we will provide a lift



from Welwyn Garden City Station (to meet trains or buses arriving between 1.30 and 2). A return lift will also be available at the end of the meeting. Again more details will be available in the next newsletter.

We are also in the process of arranging a morning site visit with the possibility of meeting at a nearby pub for lunch. This will make the Annual General Meeting part of an all day event but not all indoors. It will also give flexibility to those who would like to just meet up and have a chat but only have part of the day free. If you like the idea of meeting in a pub for lunch please contact Liz Goodyear (see back of newsletter for contact details). This would give the committee an idea of how many members might be interested and how many people the pub would need to cater for before we approach one.

Malcolm Newland has indicated that he will have plenty packets of seeds of mainly 'butterfly friendly' plants available at the AGM, in exchange for a small donation to Branch funds.

Committee Changes – HELP needed!

As most members will appreciate, the committee work very hard and give up a tremendous amount of their free time to keep the Branch running smoothly.

The problem is that at times, some of us just don't have enough time, and at a recent committee meeting it was agreed that we really do need more help. One example is that we need members to perhaps understudy a particular post and learn "the ropes" so that the person in that post can move on and take over another role when vacated. Gavin has been Chairman now for "a long time" and seriously wants to stand down. As a committee we feel it only fair that he able to do so knowing that there is someone willing to take over – at the moment we have no one free to do this. Many branches maintain a rolling post of Chairman so that no one remains Chairman for more than 2 years. There is always someone waiting to take over and this is something we would also like to consider. We are therefore asking all members to seriously think whether they would like to get more involved with the Branch and join the committee. Any offer of help would be appreciated – we would also love to have more committee members representing London or Middlesex. Please contact Liz Goodyear (see back of newsletter for contact details) if you feel you can help in any way.

London/Middlesex Venue – HELP also needed!

We know we should hold more meetings in the London/Middlesex area but we simply don't know where! Many of the branch committee live in Hertfordshire and as a result we just don't have any knowledge of suitable venues. We also appreciate that it is just as hard for a member living in Enfield to travel over to the west of the area and vice versa so we need some suggestions that might suit everyone or perhaps we will consider two different venues. We urgently want to

address this and arrange something in the winter months for our London and Middlesex members.
This is what we are looking for!

- A hall preferably in the Enfield, Barnet, Ealing or Twickenham areas
- The hall mustn't be **too** expensive to hire and available either Saturday afternoons or a midweek evening
- The hall needs to have good road access and be easy to find especially at night
- The hall needs to be close to either bus, train or underground routes – not everyone drives to meetings
- There needs to be good parking facilities at the hall or nearby
- The possibility of a joint meeting with a local natural history group that might use a particular venue would be considered

Please contact Liz Goodyear with suggestions as soon as possible (see back of newsletter for contact details)

Hertfordshire's Target Butterfly Species, by Andrew Wood

During the Autumn of 2001 John Murray and Andrew Wood attended a Butterfly Conservation symposium on Biological Action Plans. A striking feature of some of the Branch presentations was the creation of coordinators or representatives for various species in that branch's areas who would act as focal points for recording and conservation work for these species. These representatives were coordinated through Conservation committees at branch level. This seemed an excellent way of using the resources of the Herts and Middlesex branch as we have built up a very large database of records and have a membership which includes knowledgeable and active members who could fulfil the coordinator roles. Thus was born the Conservation sub committee which brings together coordinators and representative from a wide range of bodies who can help to put practical measures into place.

The committee identified a number of species that we felt needed to be given priority either because they were very restricted in distribution and the populations that we knew seemed under threat or where the species was reasonably widespread but the evidence suggested a serious decline in recent years. In setting up a framework for dealing with these species we were indebted to the work that had

been undertaken since 1998 by Christine Shepperson on the Grizzled Skipper. Christine had recruited members to survey for this species, once thought extinct in Hertfordshire in areas of likely environment, produced identification materials and written annual reports on status. This work had led us to have a much better understanding of the distribution of this species and to be able to look at the detailed habitat need of this insect. The ability to focus recording work and make practical use of it was very much in line with what we had heard about at the symposium and provided an excellent model.

The following species were selected and coordinators found. The species and coordinators are:

Brown Hairstreak - Malcolm Hull
Dingy Skipper - Brian Jessop
Fritillaries - John Whiteman
Grizzled Skipper - Christine Shepperson now succeeded by Jez Perkins
Green Hairstreak - Nigel Agar
Purple Emperor - Liz Goodyear and Andrew Middleton
Small Blue - Andrew Palmer
Small Copper - Gavin Vicary
Wall - Richard Bigg
White Admiral - Andrew Wood

We recognised that not everyone has the time or capacity to carry out detailed work on their species but their presence can act as a focus for work and recently we have selected a smaller number of species that can be the focus of detailed Biological Action Plans. Christine Shepperson's work has already been mentioned and it is not invidious to mention in particular the work of Liz Goodyear, Andrew Middleton and Andrew Palmer. Liz and Andrew have spent much time studying the Purple Emperor at a number of sites and are producing a detailed report on the species in Hertfordshire. *(Copies of this 120-page report, sponsored by the Hertfordshire Natural History Society, are now available in both hard copy and electronic formats. Please contact Liz Goodyear for details - phone number on back cover....editor.)* The good news is that their work has enabled sites in Broxbourne Woods and Tring park to be recognized as publicly accessible sites where this magnificent butterfly can be seen. Andrew Palmer has drawn up a management plan for the one known site for the Small Blue in

Hertfordshire and has established good relations with the landowner which allows practical habitat management to take place.

More information on this work can be found on the Herts and Middx Butterfly Conservation website at http://hmbutterflyconservation.org and reports from each coordinator together with photographs of each species can be found in the latest Herts and Middx Butterfly Conservation Annual Report (for 2002) (already sent to all Branch members, but new- (and non-) members can obrtain a copy from John Murray - contact details on back cover).

'Recruitment of Assistant Regional Officer drives forward work in London and the South East'

Butterfly Conservation has recently appointed an Assistant Regional Officer, Anna Bell, for London and the South-East of England. Anna will be taking on a proportion of the large work programme assigned to Emily Funnell (RO), enabling the further progress of Butterfly Conservation targets. Her role will also involve support for the local branches and network of enthusiastic volunteers who are a vital part of the organisation. This post is funded by regional branches and also by various trust funds.

Anna's background

Anna has a degree in Environmental Science (BSc) and although interested in many aspects of conservation, has a fondness for Lepidoptera. She has been working for a project run by Dorset County Council (partially funded by EU LIFE resources) to conserve Urban Heaths in the Bournemouth area: to ensure safe havens for nationally important creatures such as the silver-studded blue butterfly and the smooth snake. Anna interacted with members of other organisations (the Herpetological Conservation Trust for example) to achieve its objectives. In 2002, Anna taught Biology and Geography field studies at Lochranza Environmental Field Studies Centre, Scotland.

Anna's role

Anna is based with Emily Funnell at the Surrey Wildlife Trust Offices, Pirbright, and will work with seven branches of Butterfly Conservation: Hampshire & the Isle of Wight, Sussex, Surrey & South West London, Kent, Upper Thames, Hertfordshire & Middlesex, and

Cambridgeshire & Essex. Duties involve coordinating specific regional initiatives; assisting with public relations activities aimed at promoting Lepidoptera conservation to a wider proportion of the public; and to help organise training for volunteers.

Conserving butterflies and moths in London and the South East

London and the South East is a key region for Lepidoptera, as six of the UK priority butterfly species and at least thirty of the priority moth species are found here. There are also several priority habitats including chalk grassland and lowland heathland. However, the South East is one of the most densely populated parts of the UK, and so wildlife is under threat from development and other anthropological pressures. Anna will be working closely with the London and South East Regional Development Officer to take forward conservation action forward for butterflies and moths in the region, focusing on priority species and habitats; for example, the Pearl-bordered Fritillary and the Straw Belle. Anna says, 'I am delighted have the chance to help the organisation to conserve some of the most intriguing insects in the UK.'

Contact details:

Anna Bell, Assistant Regional Officer (London and South East England), c/o Surrey Wildlife Trust, School Lane , Pirbright, Surrey, GU24 0JN. Tel: 01483 486555.

E-mail: abell@butterfly-conservation.org

Report from the Eastern Regional Officer, Sharon Hearle

My first butterfly season as Regional Officer is nearly over and I can say that the highlight must have been the delightful Heath Fritillary at Great Wood near Southend. This butterfly illustrates very well the vulnerability of so many butterflies in the eastern region and that neglect of its habitat in this case coppiced woodland and rides can lead to extinction within a few years. Many remaining populations of High Priority butterflies such as Small Blue and Purple Emperor rely on continual management.

New Sites for White Letter Hairstreak

Careful planning and searching as many of you already know can pay off. This year I managed to locate four new sites for White Letter Hairstreak in Newmarket, Suffolk. There were already quite well known colonies just over the county boundary in Cambridgeshire on Wych Elm so the first job was to identify any sites for Wych Elm in Newmarket – quite an easy job when the tree is in flower in April. In fact it seems that Wych elm hedges or straggly shelter belts are quite frequent in Newmarket and patient waiting in late June and July paid off with sightings of the butterfly on elm and adjacent lime trees. I will now be working with Forest Heath District Council to ensure that these elm hedges and shelter belts are protected and managed as all are within the urban area.

Whilst noting down Wych Elm I also noted down any Hop and was later able to find a new 10km square record for the Buttoned Snout Moth by searching for the larvae in July.

Dingy Skipper and Grizzled Skipper

Although the survey season seemed to be over before it even began I am busy doing follow up work to many known colonies and potential sites by contacting landowners and relevant organisations. In Norfolk there is a long list of sites with no record for 10 or 20 years which may still have useful habitat and the butterflies. I am hoping that by visiting sites now and identifying whether useful habitat remains and securing permission from landowners that survey visits in the spring will be

more efficient.

In Cambridgeshire and Bedfordshire three sites are threatened by development at the moment and one other in the future so I am busy liasing with the developers and other organisations to see where habitat can be saved or created.

Species action plans can help to raise much needed awareness and funds. A draft Cambridgeshire species action plan for Grizzled Skipper has been written and I have commented on species action plans for Dingy Skipper in Suffolk and Small Blue and Duke of Burgandy in Bedfordshire.

Regional Events

I have represented Butterfly Conservation at a number of regional events including the Chilterns Area of Outstanding Beauty Conservation Day near Aldbury, Heath Fritillary Day at Southend in Essex, Forestry Commission's Regional Woodland Strategy Day near Chelmsford and the Regional Biodiversity Officers meeting in Cambridge. These events are a very useful way of gaining new contacts and up to date information about grants and projects. I have also been asked to comment and provide butterfly information for a number of management plans for local nature reserves

Discover Moths Event

There were 29 people at the first training event I have organised in Cambridge with help from the County Recorder John Dawson and with Dr Paul Waring as the main speaker. This was funded under the Heritage Lottery National Macro Moth Recording Scheme Project. Cambridgeshire is relatively under-recorded and it is hoped that many of the people who attended will go on to record macro moths at home as well as helping with target Biodiversity Action Plan species. A second event will be held in Huntingdon on September 27th.

Field Trip Reports

Field Trip to Sharpenhoe, 29 June 2003, by Graham Warne

A party of 10 members of the Beds & Northhants and Herts & Middx Branches gathered on a hot, sunny morning with confidence that we would see a fair number of Dark Green Fritillaries, our target species, on this very special site.

Dave Chandler led the party along the initially flat part of the reserve where the set aside fields usually play host to the Small Heath. Not only was that species seen in company with Small Skipper, but also the Large and Small White, Large Skipper, Red Admiral, Comma, Speckled Wood, Meadow Brown and Ringlet in the adjacent wooded margin. When the party struck out for the steeply descending hillside we were quickly rewarded with sightings of many Dark Green Fritillaries, flying swiftly and majestically over the Knapweed and other chalk loving plants, including Pignut and Scabious. It was wonderful to see literally dozens of Dark Greens – certainly a significant increase on last year – and particularly the males as they patrolled the ground in search of any mating opportunities. To complete our total sighting of 14 species, we were delighted to see a few Common Blues, a good number of Marbled Whites and some Small Tortoiseshells. (It is great to see that that last species seems to be staging a recovery after too many lean years.)

Being so hot, nearly all of the butterflies appeared to be constantly on the wing and it proved almost impossible for any photography to be undertaken. Having said that, it was on the return leg of the walk that we met Richard Revels, a professional photographer, who had been fortunate enough to spot a mating pair of Fritillaries in flight and track them down to a bush where he was able to take the unforgettable photograph shown on the facing page.

Thanks go to Dave for leading the party round a superb butterfly site on a glorious summer's day.

Photo of Dark-Green Fritillaries by Richard Revels

Broxbourne Wood Field Trips - Liz Goodyear

Two joint field trips were organised this July at the Broxbourne Wood Nature Reserve with the hope of seeing the elusive Purple Emperor, the first on the 12th with Countryside Management Service and the second on the 20th with the Norfolk Branch of Butterfly Conservation. Although in 2002 the 20th July had been a good day for sightings, it was impossible to predict back in the early spring when the dates were arranged that this summer would be so hot and dry, thus causing such an early emergence (the first report of sightings came from Brian Jessop on the 28th June at Tring Park). Unfortunately, sightings were few and far between once the 20th arrived.

The field trip on the 12th was a very relaxed affair, with people arriving and departing over the course of the day. Most of the time was spent watching the sallows along the main ride from the West carpark, near the bench opposite the path to the pond, although on several occasions groups would go and check further down the ride in case a male or female had grounded on the damp patch.

During July, many people came to Broxbourne Woods to look for Purple Emperor. Nick Sampford spent many hours waiting for sightings of this superb insect and on Wednesday 9th July he was rewarded with a great photographic opportunity. Here is his report of

the day's events of the 12th July, followed by Dave Chandler's report for the 20th July – Liz Goodyear

Broxbourne WoodField Trip Report - Saturday 12th July, by Nick Sampford

On Saturday 12th July a large group gathered in Broxbourne Woods looking for a Purple Emperor. At one point there were at least 40 people and nearly everybody was rewarded with excellent sightings. I arrived at 10.15 and walked straight to the bench where there were lots of people about and at:

10.56, Angela [Sampford] picked up a high-flying male, which gave brief views around the top of the sallow.

11.05, a male [probably] the same butterfly circled the sallow by the bench and flew high off down the track.

11.36, a male again flew from sallow to oak by bench and then back and drifted down the track to the damp patch. It was seen again at the bottom of the track by some of the group who were walking back towards the bench.

12.00, a male flew quickly around sallow and back and over the heads of the observers and was lost to view.

12.10, there was a report of a female down the track by the damp area.

12.40, I saw a very distant butterfly about a foot off the ground 150 yards up the track. I called it as a possible emperor and the group got on to it. It flew slowly down the track towards us settling 20 feet in front of the group and allowing excellent ground views for 4/5 minutes. It was a stunning male. Liz [Goodyear] managed to get the rest of the group back from the pond area in time to see it before it flew off towards us and circled the group then drifted off slowly at head height down the track behind the bench. This was a different male to the one I had photographed on Wednesday due to there being no nick out of the wing.

12.48 – 12.52, a male flew along the top of the sallow then decided to sit on a oak tree for just over 4 minutes allowing Andy [Middleton] to set his scope on it and again the group got stunning views.

1.15, a male flew over sallow then across the path towards the oak and was lost to view.

1.41-1.48, a male was seen again across the tops of the sallow. It stayed in view for a minute before it went into the centre of the tree where it was joined by a female. We lost the male in the tree but the female came out and slowly flew along the sallow and appeared to egg lay or at least inspect for egg laying. She sat in full view in 2 places for a minute or so before slowly drifting off over the sallow.

***c.*2.25** [a minute or two before the 2.26 sighting] Andy picked up 2 clashing males spiralling and chasing upwards quickly from the sallows, seen from the viewpoint, but they were lost to view due to the area and height of the canopy.

2.26, a male along the sallow briefly

2.39, a male again in same area

2.41, a male flying between oak and sallow

2.57, a male over sallow

It total there were 15 views of Purple Emperor which is my best count ever and I think everybody who went there went home happy.

We also had

Purple Emperor
Photos by Nick Sampford

numerous sightings of White Admiral possible as many as 40+ and Purple Hairstreak were there in constant view all day. In total we had 17 species:

Purple Emperor, Purple Hairstreak, White Admiral, Red Admiral, Comma, Small Tortoiseshell, Essex Skipper, Small Skipper, Large Skipper, Large White, Small White, Green-veined White, Brimstone, Meadow Brown, Ringlet, Gatekeeper and Small Copper. A Slow Worm was also seen.

Footnote: In the late afternoon, Kevin & Sandra Standbridge, Malcolm Hull, Andrew Middleton & Robert Callf were treated to the sight of a male Purple Emperor at a sap flow on an oak near the car-park. A Marbled White was also seen making 18 species in total.

Broxbourne Wood NNR Field Trip Report Sunday, 20th July, by David Chandler

Following overnight thundery rain, Sunday dawned a sunny day, with blue skies & white puffy clouds, ideal weather for the joint field trip to Broxbourne Wood NNR that had been arranged as a field trip with guest appearance from BC's Norfolk Branch.

Norfolk branch, who were on a whirlwind three-site day tour of East Anglia, joined the party shortly after lunch with the aim of seeing some of our summer woodland butterflies and the hope of a glimpse of the Victorian's elusive "noble fly", the "*Apatura Iris"*, otherwise known as The Purple Emperor.

There had been encouraging reports from Liz Goodyear and Andrew Middleton (the walk leaders, BC & Herts. NHS), who have both studied the Purple Emperor in detail in the wood for many years, that *"iris"* had been seen regularly at this location of late. However there was also a concern that as *"iris"* had emerged earlier than usual this year and that the site visit was perhaps towards the end of the butterfly's flight period rather than at its peak.

Local members of Butterfly Conservation, some Wildlife Trust & RSPB members and even one or two passing members of the public, curious at our strange woodland antics, all made their way down from Broxbourne's western car-park, the couple of hundred yards or so down the main ride, to the small clearing where the wood opens up.

This is the point, near the Emperor's favourite oaks and pine trees, beside the seat, where there are good views of the sallow trees (the butterfly's food plant).

Travelling down from the car park there were Ringlets, Speckled Woods, Meadow Browns, Gatekeepers, Peacocks, Common and Holly Blues on view plus a Comma flying along the bridle path. Just before the small clearing Small Whites, Green Veined Whites, Large & Small Skippers and another Comma were seen.

Arriving at the seat, where a small ride crosses the main ride, we waited about an hour and saw two White Admiral before the first of two sightings of an Emperor, two brief flurries of excitement around 11.30am & 11.35am. Then the sun went behind some clouds and butterfly activity stopped. Shortly afterwards we did see a Red Admiral, high in the canopy, which sometimes can fool uninformed Emperor watchers, but the RA has much less pointed wings.

During the dull period we saw another Comma, a possible White-letter Hairstreak, which is more chocolate-coloured than the Purple Hairstreak, and then two genuine Purple Hairstreak, made their appearance in the oak canopy above.

David Watson had brought a telescope and very fine views were obtained of the Purple Hairstreak as the small silvery butterfly walked in small circles around the oak leaf sipping honeydew and slowly opened and closed its wings as the sun and cloudy shade alternately warmed and cooled it. The Purple Hairstreak stayed around on his leaf for a good twenty minutes so giving all who saw it in such close detail (orange antenna tips!), a magnificent view.

Purple Hairstreak
Photo by Alan Barnes

Norfolk branch then joined the group. After a quick second look at the sedentary Purple Hairstreak, the sunshine came back and we saw a White Admiral. We all paused and it alighted on ferns near the sallow tree by the path for a few minutes and most were able to get a good close view.

Then, around 1.30pm, back up the hill from the main ride's crossroads there was a fleeting moment of excitement

as Andrew spotted an Emperor swiftly fly across the ride and go amongst the fir trees. Only one or two members were quick enough to respond and catch a glimpse. Back down the ride, *"Iris"* made two further appearances around 2pm and I'd guess about half the party of around 25 people got a brief sighting. And that was about it for the day.

Unfortunately no Emperors descended to the ground today, but speaking personally, I had two sightings out of the five; these were my first *ever* sighting of this species in 40 years of looking at butterflies; so it was still a "red letter" day for me.

It was now 2.45pm and a few clouds were beginning to gather and it became overcast. We headed back towards the cars but there was still time to see some dragonfly patrolling the main ride.

Summary: 15 different butterfly species (5 Emperor sightings).

Sun 65% Average Temperature: 23C Duration 4.0 hours.

Other species of interest seen: Honeysuckle, Sallow.

Dragonflies: Southern Hawker & Brown Hawker Dragonflies.

Gift Aid, by John Hollingdale

As many of you know, in July, encouraged by HO, I sent Gift Aid forms to 250 members; the list coming from HO. Here is the result, so far, of that exercise. Up to the 14th of August, 76 new Gift Aid forms had been received. This will result in Butterfly Conservation being able to reclaim approx. £462 tax per year from 'The Revenue'.

Several of you also informed HO that you didn't pay tax and they will ensure that you are not mailed in future. If any other member is a non-taxpayer, please inform HO so that you also won't receive any future mailings.

Thanks to all who took the trouble to respond to my letter.

No Butterfly Books in Bookshops, by Michael Pearson

Earlier this summer, while browsing through the "Natural History" section of my usual local bookshop, and remembering Malcolm Hull's excellent book-list in the last Branch newsletter, I looked to see what butterfly books were on sale. I was astonished to find that there was not one single butterfly title, of any sort, available on the shelves. I challenged the shop manager, who told me that they had sold out, but he would order me one if I wanted. Now, more than two months later, there are still no butterfly books; (however, I can buy a book on the Duck-billed-platypus instead, which is a relief !).

As a result of this experience, I widened my enquiries to include five bookshops in the SW of the county; four of these being smaller local branches of national chains, and one independent bookshop. The results, from the point of view of of an interested layman looking for a butterfly book, were rather depressing.

If I'd been looking for a basic identification book of the butterflies I'd seen flying over my garden or school grounds, I would have been totally unsuccessful; there was not one, even remotely suitable, book in any of the five shops. Similarly, if I'd been a potential - or actual - BC member looking for a fieldguide to British butterflies, I would have come away empty handed. There was one butterfly book which was available in four of the shops - "Butterflies and Moths" published by Dorling Kindersley: this turned out to be about exotic tropical species. To be fair, I could have bought in one shop a guide to British insects, which did include butterflies and moths along with everything else.

The only significant exception, to what was an otherwise largely fruitless search, was that two of the shops did stock Brian Sawford's "The Butterflies of Hertfordshire": we must be grateful for that, at least.

All the bookshops I visited offered a wide choice from dozens of titles, directed at levels of expertise from beginner to expert, covering other wildlife groups; birds, mammals, wildflowers, fungi, dragonflies, trees etc - but not butterflies. I wonder why this should be: is this a general situation experienced in other parts of the county,

or is it just peculiar to my five bookshops? Has anyone any thoughts on the subject? Is there anything that can be done to improve things?

Defence Mechanisms in Butterflies and Moths, by Michael Barry

Life could hardly be more hazardous than it is for butterflies and moths. Only a tiny fraction survive their early stages from egg to caterpillar and pupa to reach adult life, and most of those that do probably live for no more than a few days. The natural hazards confronting them include viral, bacterial, and fungal infections, parasites (which live off the host but do not kill it), parasitoids (which gradually consume the host from within, eventually leading to its death), environmental factors, insectivorous plants, and animal predators. The greatest losses occur at the larval stage; thus it is said that a parenting blue tit delivers a thousand caterpillars a day to its nestlings. Protective mechanisms against these hazards variously include immune processes, chemical defences, the ability to fly, nocturnal habit, concealment, mimicry, and demography.

Demographic factors must be crucial for counterbalancing the massive losses sustained by lepidoptera in their early stages. Consider, for instance, a female butterfly emerging in an English spring, mating, and laying 200 eggs (a not unreasonable figure). Suppose that all her progeny reach maturity, and that all her 100 daughters reproduce with equal success, and so on for three generations through the English summer. By autumn our original female would have generated 2 million great grandchildren. In the tropics, where five generations might be more usual, the corresponding figure would be 20 billion. Such tremendous reproductive potential has defensive implications at a population level, for instance by facilitating the rapid correction of unpredictable population imbalances, or by predisposing to an increased frequency of spontaneous mutations that might confer advantages in natural selection; but unchecked, and on a global scale, it could lead to rapid de-vegetation of the planet and thus to extinction ofaerobic life.

Against the foregoing perspective, this paper focuses on the role of the morphological features of colour and shape that butterflies and moths

have evolved in their struggle against predation, and it is mainly the adult insects that are considered. Of course, colour does have important functions apart from defence, for instance assisting in species-recognition and sexual selection in day-flying insects, and facilitating thermoregulation in those living at high altitudes and high latitudes, darker colours enhancing the absorbtion of radiant heat. However, in the evolutionary process it is defence against predation that will have provided the main selective drive and here colour patterns have come to be used in two basically opposite ways: on the one hand to make the insects as inconspicuous as possible by means of cryptic, disruptive, or distractive colouration (essentially camouflage), and on the other hand to render them as conspicuous as possible by combining bright warning colours and ostentatious behavior with unpleasant physical or chemical properties (essentially deterrence).

Crypsis (Camouflage) The words, respectively of Greek and French origin, mean hidden, unseen, or merging with the background, and fittingly apply to the way that nocturnal species rest up by day seeking protection from birds, small mammals, and other vertebrates. The colour pattern evolved generally reflects the appearance of the moth's preferred substrate. Thus, many moths rest on bark and are patterned accordingly; good examples would include the Grey Pine Carpet, Small Waved Umber (Fig. 1), Beautiful Brocade, and Mottled Beauty. The Mottled Beauty also occurs as a moorland species where its pattern blends with the rocks on which it rests. Bark is often covered with moss, algae, or green lichens on which species such as the Green Pug, July Highflyer, and Marbled Green like to settle. The grey crustose lichen on the underside of oak branches provides a substrate on which species like the Peppered Moth, Merveille du Jour, and Oak Beauty (Fig. 2) are virtually invisible. In 1848 it was noted that the typical pale form of the Peppered Moth was being rapidly replaced in the industrial cities by the melanic form *carbonaria.* After decades of controversy, it was eventually agreed that this was mainly due to differential predation of the all-too-visible typical form in the soot-encrusted environment, enabling the coal-black *carbonaria* form to fill the gap. Since the Clean

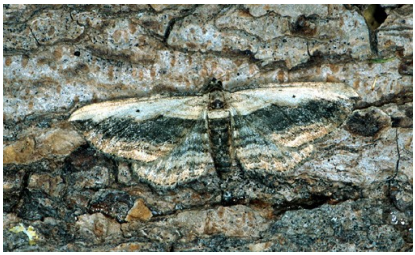


Figure 1
Small Waved Umber - crypsis

Air legislation of the 1960s the relative status of the two forms has gradually returned to its previous norm. Very pale moths like the Emerald moths and Blood-vein hide underneath leaves, while moths of grasslands and sedges like the Wainscot species have evolved straw colouration and heavy venous striations on their forewings to enable them to blend with their habitat.

Figure 2
Oak Beauty on crustose lichen
- crypsis

Cryptic colour patterns are much less frequent among the day-flying lepidoptera, which of course particularly comprise the butterflies, and the distribution of their camouflage is different. In moths it is the uppersides of the forewings that are camouflaged whereas in butterflies it is the undersides of the wings (especially the hind wings) that exhibit crypsis. This reflects the differing resting postures usually adopted by butterflies and moths. The prime example of crypsis in a British butterfly must be the Green Hairstreak, its plain green undersides making it very difficult to spot against background vegetation; only in flight does the Green Hairstreak open its wings and then the twinkling effect of the chocolate uppersides and green undersides makes it quite difficult to follow. The Grayling is another butterfly which always rests with its wings closed, often leaning over to cover its shadow while catching the sun's rays as it rests on warm earth or rock, its retracted forewing covered by the cryptic variegated brown and grey pattern of the hind wing.

In Europe, hibernating adult butterflies conceal themselves in dark nooks or crannies in trees, caves, hedgerows, or buildings, their wings opposed above their bodies so that only their dark cryptically patterned undersides are exposed. The Comma has raggedy wing outlines resembling the shrivelled leaves that it hides in. The Small Tortoiseshell combines a dark cryptic pattern with a pale disruptive band. The Peacock looks just dark but in detail shows an exquisite vermiculated pattern of black lines against a background wash of blue, grey, purple, and brown. The Brimstone is unusual in having pale undersides combined with an angular wing shape resembling the under surface of the leaves of the ivy clumps in which it hibernates.

In fact, many butterflies and moths have evolved appearances resembling leaves in all their various forms, dead or alive, and in the evergreen deciduous forests of the tropics several nymphalid genera take on dead leaf appearances of such detailed precision, with wings of elliptical shape complete with midrib and protruding stalk, vein-like patterning, worm holes and patches of mould, as to justify the term protective resemblance.

Of course the ultimate in crypsis would be the invisible butterfly and this very nearly exists in two neotropical satyrine genera, *Cithaerias* and *Haetera,* which are almost completely transparent except for some brown pigmentation and small eyespots on the hind wing margins.

Disruptive patterning In their hunt for prey, predators use a search-image, based on experience and memory, matching some general feature about the appearance of their quarry. This concept may be likened to one's ability to pick out a particular brand of soap powder by quickly eyeballing the kaleidoscopic assembly of boxes on a supermarket shelf. The triangular shape of lepidoptera in general, and moths in particular, is perhaps their most characteristic morphological feature, providing an obvious basis on which to form a search image. It follows that, in the evolution of day-flying lepidoptera, any colour pattern tending to disrupt the triangular outline of the wings, obscuring their shape against the background, would possess strong selective advantage. The same principle applied to the zigzag rainbow camouflage used to protect surface ships against submarine attack. The concept is widespread in nature and effective but is not easily conveyed in photographs taken at point blank range.

In disruptive colouration a contrasting pattern of dark and light shades is most common, a beautiful example being the bizarre maze of stripes and bands and zigzags exhibited by the South American nymphalid *Colobura dirce* and the equally beautiful *Baeotus amazonicus*. Another strikingly conspicuous but visually meaningless underside pattern of black and white concentric rings, totally incongruous on a butterfly, characterises the neotropical genus *Diaethria* (Fig. 3). Examples of disruptive colouration among European lepidoptera are seen in many day-flying moths like the Green Carpet and the Streamer (Fig. 4), and the underside pattern of the Orange Tip and Small Tortoiseshell.

A disruptive pattern may be combined with cryptic colouration, as in

the strong straight lines bisecting the wings of the Blood-vein and Light Emerald moths, or form part of a distractive pattern as in back-to-front mimicry in butterflies.

Colour Pattern Polymorphism Another stratagem evolved by many of our commonest moth species to confuse the predators' search-image has been for members within a population to develop a wide variety of different colour patterns. The predator can then either form only a confused idea of its intended quarry, or else has to remember multiple search-images.

Three of the many moth species demonstrating colour pattern polymorphism in Somerset are the Common Marbled Carpet (at least nine forms occur on the Blackdowns), the July Highflyer, and the Lunar Underwing.

Figure 3
Diaethra marchali
Disruptive colouration extraordinaire !

Figure 4
The Streamer
Disruptive colouration

Flash Colouration and Startle Pattern Imagine the following scenario: bird spots large brown moth (Large Yellow Underwing) on lawn and moves in for the kill. Alert to approaching danger, moth flashes open its yellow underwings; disconcerted bird hesitates and moth beats it into nearest cover, vanishing with a final flash of its yellow skirts. Pursuing bird vainly searches for moth with the bright yellow wings which by now are well under wraps.

Quite a number of moths with brightly coloured hind wings exhibit flash colouration including the various species of Yellow Underwing, the Red Underwing, and Orange Underwing. As well as its startling effect, flash colouration is also said to make it hard to follow butterflies in flight

(reference has already been made to the twinkling flight of the Green Hairstreak) and it is postulated that this may be the reason for the stunningly iridescent blue uppersides of the giant blue Morpho butterflies of South America.

Scary Eye Phenomenon Many satyrinae, lycaenids, and swallowtails have small eyespots on their wings diverting the attention of an attacking predator away from the vulnerable body of the insect. However, some butterflies have much larger eyespots that appear to subserve a different function. Most familiar is the Peacock with large apical eyespots on all four wings. It usually feeds on a flower head with its wings closed, showing the dark undersides, but if threatened opens its wings to display the eyespots, at the same time rubbing the wings together to create a hissing sound loud enough to deter many predators. The Emperor Moth has similar markings and exhibits very similar behaviour. The giant Owl Butterflies (genus *Caligo*) of the neotropics have huge mammalian-like eyespots of very scary appearance on their undersides, and in the same rainforests the equally large Morphos have a line of seven large target-like ocelli on the undersides, their function uncertain.

Distracting and Diverting Patterns These terms describe features intended to divert the attention of attacking predators away from the insect's vulnerable head and body. Best known are the submarginal eyespots on the wings of satyrine butterflies. The eyespots are generally small, but with a large one at the apex of the wing. The frequency with which one sees butterflies with wedge-shaped defects at the wing tip appears to justify this strategy. Butterflies are particularly vulnerable to bird attack upon first landing. When the Small Heath butterfly first settles it sticks its forewing up like a small pennant, showing the eyespot above a bright orange patch, but after a few seconds, when the immediate risk of bird strike has passed, it pulls its forewing down behind the hind wing and blends into the background. The Grayling goes one better with two large eyespots on each wing, usually showing just one as a standard reaction on first settling but revealing both when feeling severely threatened.

Back-to-Front Mimicry This is a fascinating elaboration of distracting and diverting patterning. The typical features incorporate (1) long tails on the hind wings with (2) a conspicuous eyespot on the adjacent wing margin, the combination resembling a large head with conspicuous antennae together presenting a more compelling

appearance than the real head at the other end, and (3) a series of prominent dark stripes across the undersides converging on the eyespot, emphasising the deception and further diverting the attention of a watching predator away from the real head (and incidentally providing disruptive colouration when the insect is amongst foliage).

Back-to-front mimicry is a good example of convergent evolution, being found widely around the world in several different butterfly families, notably the swallowtails, hairstreaks, and riodinids. The Scarce Swallowtail (Fig. 5) of Eurasia not only relies on its back-to-front mimicry for defence but further confuses any watching predator by turning through 180° upon settling so that its real head-end faces back in the direction from it arrived. The tiny Hypolycaena hairstreaks of the African rain forests have multiple ribbon-like tails of quite extraordinary length that float about in gentle air currents and can also be moved about and twisted together by the butterfly itself, rubbing its wings together – another diversionary embellishment!

Aposematic Colouration Aposematism refers to the phenonemon by which an organism uses a conspicuous colour pattern to warn vertebrate predators that to eat it would be unpleasant (or dangerous) owing to its unpalatable (or poisonous) properties. Lepidoptera commonly use various combinations of red, orange, yellow, black, and white, and less often blue and green. It should be stressed that in nature these colours do not universally denote disagreeability - holly berries, for instance, may be red, orange, yellow, or white but are greedily consumed by the thrushes long before Christmas. Consequently, aposematic colouration is sometimes defined as *true* warning colouration indicating unpalatability.

Advertisement is the name of the game in aposematism. Conspicuous colouration is accompanied by ostentatious behaviour. Aposematic butterflies fly happily in the open and their flight is often provocatively slow and deliberate. Inevitably, naïve predators will take a few as part of their learning process, but the loss of a few is to the advantage of the many that survive.

The noxious or toxic substances that aposematic lepidoptera sequester in their bodies can be derived in two ways. Some lepidoptera, for instance the Burnet moths in Europe, the *Heliconius* butterflies in South America, and the *Acraeae* in Africa, are able to synthesise hydrogen cyanide from their own endogenous metabolic processes.

Figure 5
Scarce Swallowtail
Back-to-front minicry and disruptive colouration

However, most unpalatable butterflies and moths acquire their toxicity through substances ingested at the caterpillar stage from the larval food plant, chemicals originally evolved by the plant to protect itself from being eaten.

Aposematism is most common in the tropics. In Europe, butterflies known to be aposematic are the Large White (mustard oils from Brassicaciae), the Marbled White (pyrrolizidine alkaloids from fungi on its grass food plant), and the Monarch (cardiotoxic alkaloids from milkweeds). Quite a number of our moths are aposematic including the scarlet, yellow, black and white Tiger Moths (pyrrolizidines), the dark grey and carmine Cinnabar and its black and yellow banded caterpillar (cardiotoxins from ragwort), the black, white, and yellow Magpie Moth (which uniquely is also poisonous for spiders), the aptly named White Ermine, and the black Chimney Sweeper. Undoubtedly there are others yet to be identified.

Mimicry This is a form of convergent evolution whereby a non-aposematic (i.e. palatable) insect, by a succession of favourable but fortuitous genetic mutations occurring over an evolutionary period of time, and through the process of natural selection, has gradually come to resemble (i.e. mimic) an aposematic species (the model) in both appearance and behaviour, thereby gaining survival advantage. Individuals not undergoing such advantageous mutations will be less likely to survive and will therefore gradually die out.

This form of mimicry is known as Batesian mimicry, the mimic being palatable and the model poisonous. For the mimicry to be successful it is important that mimic and model should co-exist in both time and place, and that the mimic should be less numerous than the model (obviously the greater the preponderance of the model, the greater the advantage to the mimic whereas the closer they are to parity the more the model is disadvantaged).

In another form of mimicry (Mullerian mimicry) a similar evolutionary process occurs in two or more unpalatable insects, thereby mutually reinforcing their protection. A Mullerian mimicry ring can involve a number of species from different families and may also include a non-poisonous Batesian mimic to form a complex mimicry ring. The species making up such a ring may show a wide range in palatability, varying from the palatable or only mildly distasteful to the seriously poisonous.

Mimicry is most common in the tropics, reflecting the enormous diversity of species there and the higher reproductive rate, enhancing the opportunity for advantageous genetic mutations. In Europe we are rather unfamiliar with mimicry but good examples of Batesian mimicry (implied by their names) exist with the Bee Hawk-moths and the Hornet Clearwing Moths respectively, and a good case can be made for Mullerian mimicry (probably a complex ring) centred on the female Large White and including the females of the Small and Green-veined White and Orange Tip butterflies.

Resemblance to Distasteful Objects (Protective Resemblance and Bird- dropping Mimicry) Here the terminology becomes rather confused. Strictly, mimicry is bound up with aposematism and refers to animate objects. Protective resemblance refers to inanimate objects, the precision and specific detail of the resemblance distinguishing it from the more general application of camouflage/crypsis. In the case of bird-dropping mimicry, the subjects are usually spread out openly on a leaf and so advertisement is manifest and crypsis hardly applies, but the element of unpalatability is certainly implicit. Various caterpillars, for example those of the Comma butterfly, the Alder Moth, and some tropical swallowtails, are excellent bird-dropping “mimics”, as is the Black Hairstreak pupa, and the adult Chinese Character and Lime Speck moths. Other examples of protective resemblance include many geometer moth caterpillars that adopt outstretched attitudes looking just like twigs or leaf stalks, and previous reference has been made to resemblance to worm-eaten and mouldy leaves in some tropical butterflies (e,g. *Kallima* and *Zaretis* genera).

Stinging hairs This applies mainly to the caterpillar stage. Many caterpillars are spiky, spiny, hairy, or furry, and for a bird this may often be just sufficiently awkward to handle, or uncomfortable to eat, to put it off. Birds seem to vary in their ability to handle hairy caterpillars but the Cuckoo is well known for its predilection for them

and its decline in recent years has been attributed to the decline in the moths. A thick layer of hair may also make it more difficult for parasitoids to gain access to the body of the caterpillar. However, sometimes these ectodermal structures have a more aggressive potential, causing an itchy urticarial reaction resembling nettle rash; this may be physically induced through the hairs breaking off in the skin, or due to injection of a chemical into the skin, either histamine or a protein complex. Severe reactions, sometimes of an anaphylactoid nature, can ensue and may be delayed in onset. Caterpillars of aposematic moths such as the tiger moths, tussocks, and processionary moths specially tend to be equipped in this way. Stinging hairs are not so common among adult moths but the pure white adult tussock moths (the Brown-tail and Yellow-tail moths) are not only aposematic but also have stinging hairy tails which inject histamine and need to be handled with care; as the Brown-tail caterpillars occur in swarms and are fond of seaside habitats they can present a public health hazard!

This paper is based on notes for an illustrated lecture to be given to the Somerset Wildlife Trust at The County Library in Taunton on the 11th November 2003.

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Copy Deadline for the December Newsletter will be

20 November 2003

NB it helps the editor if you can submit an electronic copy of your article (but don't worry if you can't). Files can be on disk or sent by e-mail to ian.small@lineone.net or send an article by post - address on back cover

As this next newsletter is scheduled for the heart of winter, why not send me your stories of long hot summer days watching butterflies - which we can all enjoy whilst we sit with our mulled wine, christmas pies etc. looking out over frosted gardens (or rain !)

Conservation Dates

Conservation work is one of the most important activities of the Society, as loss or neglect of suitable habitats is one of the major reasons for the decline in many of our butterflies as well as other wildlife.

Below are a series of dates across Herts. and Middlesex where you can help with essential management that aims to maintain the correct conditions on these sites for the wildlife that inhabits them. Several of the dates are run by the HMWT on their nature reserves.

Millhopper's Pasture SP 900149. Fourth Sunday of the month. Meet at 10.30 am. John and Margaret Noakes need your help. (01296) 660072.

Therfield Heath, TL 335400 First Sunday of each month from 10.00 a.m. - 1 p.m. Details from Vincent Thomson (01763) 341443.

Duchies Piece (Aldbury Nowers) SP 952131. Third Sunday of each month. Meet 10.00 a.m. in the lay-by, near Tring station. For details ring Alan Strawn (new reserve warden) on (01442) 232946

Hertford Heath TL 354111. For details ring Anthony Oliver on (01992) 583404.

Fryent Country Park - details from Leslie Williams at the Brent Ecology Unit on (0181) 206 0492

Patmore Heath TL 443257. Meet at 10.00 a.m. on the last Sunday of each month. Further details from Gavin Vicary (01279) 771933

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