

## **Cornwall Butterfly & Moth Society Newsletter**

**Autumn 2016 Issue 04**



Cornwall Butterfly and Moth Society (CBMS) embraces a variety of interests and opinions regarding the welfare of both butterflies and moths. A standard of our group is a willingness to listen to other opinions in a respectful way whilst sharing a common interest in butterflies, moths and other forms of wildlife, fresh air, exercise and good companionship.

The previous issues of our newsletter contained parts of an article written by Malcolm Lee and the next instalment of his excellent and interesting report about the Large Blue butterfly appears later in this issue.

### **AGM**

Our AGM is being held on Sunday 5<sup>th</sup>. March 2017 at the Fraddon Village Hall. Details of the event will be sent out after Christmas.

### **Future Newsletters**

Rowena Nicholls has kindly volunteered to produce our newsletters in addition to managing our website and Facebook pages.

Please help by sending photos/sightings and articles to Rowena whose email address is rowenacastillonicholls1972. Ideally the articles should be about 150 to 300 words.

## **Sad news**

Sadly two of our members have died since our last newsletter due to serious illness.

### **Gerry Tremewan**

Gerry was an internationally renowned expert on Burnet moths and worked at the Natural History museum until his retirement. After retiring he achieved his doctorate and has written a number of books some of which he has co-written with other experts. Gerry was the Editor of the Entomologist's Gazette and was popular amongst Cornwall's many moth enthusiasts.

### **Hilary Johnson**

Hilary was one of our founder members and previously belonged to Cornwall Lepidoptera Breeding Group. Hilary was also the partner of the late Steve Hoskin. It is sad that Hilary nursed Steve for many months until he died and then became ill herself with a similar illness. She was a caring and unselfish person who previously worked as a nurse.

## **Large Blue Report**

### **THE OCCURRENCE OF THE LARGE BLUE BUTTERFLY (*Maculinea arion* L.) IN CORNWALL**

*by Malcolm Lee, Gullrock, Port Gaverne, Port Isaac, Cornwall, PL29 3SQ.*

#### **PART THREE**

##### **1963 to 1975 - THE JOINT COMMITTEE, SURVEYS AND EXTINCTION**

On 21st January 1963, the Joint Committee for the Conservation of the Large Blue (JCCLB) held its first meeting. It was set up under the umbrella of The Nature Conservancy, and consisted of representatives from the Cornwall

Naturalists' Trust, Devon Naturalists' Trust, Royal Entomological Society, and the Society for the Promotion of Nature Reserves, with Leslie Harvey as Chairman, and Malcolm Spooner as Secretary. It was realised that current information was lacking, so the first task was to undertake a thorough survey of the Large Blue's former range from Tintagel to Hartland. The Nature Conservancy provided a grant totalling £980 over 2 years to cover the costs of the survey, known as 'Operation Marion'.

In March 1963, Owen Hunt was appointed to undertake this survey, supported by volunteers from the committee and the two Naturalists' Trusts. Hunt arrived in North Cornwall on 15th June 1963, initially staying at The Tree Inn, Stratton. On 29th June he moved to Hartland Quay Hotel in Devon, staying there throughout July. As had happened to Spooner and to Jackson, bad weather prevailed through most of the survey. The flight time was late, as Large Blues were not seen until his first visit to Tidna on 28th June, the day before he moved to Hartland. In the two weeks at Stratton, almost all of his visits were to sites in Cornwall. He had a copy of Jackson's survey, and visited all his sites. Clearly he had obtained some additional information, as he went to nine locations not mentioned by Jackson, in six of which he found the Large Blue. It is possible that one of these negative sites was the area of an earlier introduction. The only information recorded on this informal experiment was a comment by Dr Frazer of The Nature Conservancy that it took place prior to 1947 somewhere 'near Bude' following scrub clearance at the site. It was apparently successful for some while, even after the death of the person responsible.

In Cornwall, Hunt and his team of volunteers made a total of 91 visits to 23 locations. Only 18 visits were successful in 8 sites, all north of Bude, with an aggregate total of 64 Large Blues. These included two of the three best Atlantic coast sites - Tidna with 27 butterflies and Yeol Mouth with 18 butterflies (Hartland in Devon, with 12 butterflies, was third). The numbers were pitifully small for so many visits.

South of Bude in 1963, Hunt found nothing, although O G Watkins, an experienced observer, was certain that he saw two Large Blues at Epphaven and Trevan Point, sites unknown to Hunt. Of his 32 visits south of Bude, 21 were before any Large Blues were seen, and 8 were in late July when the flight was almost over. There were just three visits within the main flight season,

only one of which was on a fine day. He visited south of Bude in 1964, and again in 1968, but never saw any Large Blues. The butterfly seems to have hung on here, but virtually at extinction point. Other recorders found butterflies around Millook in 1964, and, despite the pleas not to take Large Blues, Ian Heslop visited Millook in 1969 and added five (!) more to his collection. There was also a reported sighting in 1974 at the Dizzard.

North of Bude, the position was better, but still dire. 1964 had much better weather than 1963, and one piece of positive news was the addition of Northcott Mouth to the list of extant sites, but with a single butterfly only. The overall situation was depressing, with extinctions in Marsland, Morwenstow Valley and Vicarage Cliff, and the sites at Stanbury and Lower Sharpnose were down to a single butterfly. Numbers at Yeol Mouth and Litter Mouth were greatly down. Only Tidna had increased. This was now the principal UK site, with 119 butterflies marked, and an estimated population of around 200. In Devon, Welcombe was the second biggest site, with 31 butterflies, and the area around Hartland still held small numbers.

In Hunt's 1968 survey, the Cornish population was just 50 butterflies at Tidna, and a possible singleton at Litter Mouth. In Devon, the Hartland area now held the largest UK colony, with 82 butterflies, and a singleton was present at Speke's Mill. Hartland became extinct in 1971, and Tidna held on for just a few more years. The last Atlantic Coast Large Blue was seen here by Tony Archer-Lock on 12th June 1975, leaving just one UK colony on Dartmoor, but this became extinct in 1979.

## **REASONS FOR THE LARGE BLUE'S DECLINE**

From the earliest days, the Large Blue was renowned for suddenly disappearing from its known haunts for no apparent reason, and often after a period of abundance. In 1884, Herbert Goss, Richard South and Herbert Marsden set out their views on the probable extinctions in the Cotswolds. This was the UK stronghold in the mid-1870s, but none had been seen there since 1880. Goss dismissed the suggestion that grass burning was the culprit, pointing out this practice had been going on since time immemorial, and in any event had never been undertaken within the open spaces of the beech woods, where the Large Blue had similarly disappeared. Goss also dismissed collecting, as this could not have accounted for such a rapid extinction over such a wide

area, but felt it may have been responsible in a few limited areas. He concluded that an unprecedented succession of mild winters, ungenial springs and wet and cold Junes were the prime cause. South concurred with Goss, as did Marsden, a local collector with much experience of Cotswold Large Blues. Marsden pointed out the decreased flowering of the foodplant in the poor weather, and agreed that grass burning was unlikely to have been a significant cause. Regarding over-collecting, he made the point that in all his years systematically surveying the Stroud end he never met a stranger collecting, and at the other end just one amateur collector. Despite no butterflies having been seen in the Cotswolds during the early 1880s, it was not extinct, and must have survived these years at low densities, to become locally common again.

In 1963 Malcolm Spooner wrote an important article on the causes of the decline. He summarised the main factors affecting the life cycle of the butterfly: foodplant, ants, predators/parasites, climate, and collecting. Destruction of the foodplant by 'thyme-consuming' agencies was a most significant factor in the decline, either by natural ecological succession of scrub to crowd out the thyme, or by agricultural improvements. Whilst the Large Blue's dependence on ants was a limiting factor, he concluded this was unlikely to have caused any declines - ants were always widespread in the kinds of places thyme is found. Predators and parasites could never have played any part in the decline. He considered the butterfly was strongly susceptible to climatic fluctuations, particularly in a succession of cool summers and mild winters. This, however, would be likely to lead to periodic fluctuations in numbers only, rather than total extinction. (It is worth pointing out that cool summers - as Labouchere, Spooner, Jackson and Hunt found out - and mild winters are the norm for Large Blues living on the Atlantic fringe, but this is not so for those at inland UK sites.) Regarding collecting, he came to the same conclusion as earlier writers, that the decline of the Large Blue would not have been much different if there had never been any collecting.

Despite this review of all these negative factors, and determined efforts to mitigate them, the decline continued. There were nagging doubts over the completeness of our knowledge of the life cycle, worked out almost 60 years earlier by Frohawk and Chapman. Something must have been overlooked. In 1972, Jeremy Thomas was appointed to undertake a full time study of the ecology of the Large Blue to see if anything had been missed. By this time, the

last remaining Atlantic coast colony at Tidna was virtually extinct, and the only UK site left for research was on Dartmoor. The conclusion of this painstaking analysis was that a colony's prospects depended solely on how well the larvae survived in the ant nest. Compared with this, the number of eggs laid per female, and the survival rates of those eggs and larvae on the thyme were irrelevant. A more detailed study of the crucial underground stage led to other important discoveries. When caterpillars drop off the thyme plant, they do not search out the ants, as had previously been thought, but wait to be discovered. If they were not discovered within a day or two they died. Of the adopted caterpillars, the size of the ant colony may only provide ant grubs for just one, or rarely two, and is often insufficient for even one. It was also found that in those larger nests that may have ample brood to feed several caterpillars, worker ants often killed them. Where a queen was present, she secreted chemicals that made the workers attack grubs that could become potential rival queens. The workers identify these potential rivals from their larger size, so when the caterpillars reach this size they are invariably killed. This led to the crucial discovery that in the nests of just one ant species, *Myrmica sabuleti*, (which can have large queenless nests) did caterpillars survive in significant numbers.

Here was the missing information. A suitable Large Blue site had to have abundant thyme, and very high densities of *Myrmica sabuleti* within a metre of the thyme, in order for most caterpillars to be discovered by foraging ants. Checking all the former sites revealed that, whilst thyme was often still abundant, *Myrmica sabuleti* was absent. In contrast, the remaining Dartmoor site still had both. A visit to continental Large Blue sites showed that, like Dartmoor, *Myrmica sabuleti* and thyme were still present. This led to the final piece in the puzzle, which was the conditions necessary for this ant. Jeremy Thomas found that *Myrmica sabuleti* was adapted to a warmer climate than is generally found here, so it could only survive in the very warmest of habitats. Those sheltered south facing Large Blue slopes would be warm, but only in the closest cropped turf was the sun able to bake the ground to make it sufficiently hot for the ant. A barely perceptible increase in grass height of just a few centimetres cooled the ground such that *Myrmica sabuleti* died out, to be replaced by unsuitable ant species.

This mechanism explained those mysterious disappearances of Large Blue colonies. Whilst there was suitable grazing to keep the turf closely cropped, *Myrmica sabuleti* could survive, but a slight relaxation in the grazing regime, and this suitable ant would rapidly be lost. Once gone, most subsequent larvae were doomed to die in the nests of those other ant species that replaced it. Superficially, the habitat seemed unchanged, and it could take many more years before the encroaching scrub swamped out the thyme. This study also explained why numbers could crash after a bumper year, as a surfeit of caterpillars would outstrip the available ant larvae food supply and the greater part of those caterpillars would die underground from starvation.

Sheep or cattle would formerly have grazed many of the Large Blue slopes. As this became uneconomic, the steep sides were abandoned and the grass grew. As Labouchere discovered, some farmers burned a portion of the slope each spring. Around the time of the First World War, the shortage of labour followed by an agricultural depression meant this practice was being abandoned. The slopes scrubbed over and the Large Blue disappeared.

Rabbits were an important grazing factor on the Large Blue slopes and after the farm animals were removed, virtually the only one. North Cornwall held prodigious quantities, with many coastal valleys slopes covered in rabbits. A clap of the hand and the valley sides seemed to move as they rushed to the safety of their burrows. A significant commodity on the North Cornwall Railway in the 1930s and 1940s were rabbits for the meat markets of the Midlands and London, where they were a more important freight than cattle. Each year around a million rabbits left from the stations between Tresmeer and St Kew Highway, having been obtained by local catchers visiting farms every few months to set traps. One local 200 acre farm had an annual yield of almost 5,000 rabbits, some 25 to the acre. This all stopped when myxomatosis arrived in south east Cornwall in the 1950s. North Cornwall farmers would travel there to pick up rabbit corpses to spread the disease on to their farms. By the mid-1960s, the rabbit population was decimated. This proved the final straw for the beleaguered Large Blue, as the remaining grazing pressure was removed. Hunt noted in his 1963 report that a thriving rabbit population still survived at Tidna and Yeol Mouth, and it was significant that these valleys held the biggest Large Blue colonies.

It is a sad fact that the crucial information from Jeremy Thomas' study came just too late to save the British race. Had it been known only a few years earlier, the story would have been very different. In retrospect, it was unfortunate those early entomologists were successful in rearing Large Blues with other ant species. Frohawk reared Large Blues in the nest of *M. scabrinodis*. In his day, *M. sabuleti* was known as *M. scabrinodis*, var *sabuleti*, so possibly this variety was used by chance, or perhaps he was just lucky. Dr T A Chapman used *M. scabrinodis* var. *sabuleti*, and Captain Purefoy successfully bred Large Blues using *M. laevinodis*. Perhaps the artificial nature of the experiment caused the ants to behave differently. On the observations they had made, it is difficult to see how they could have drawn any conclusion other than the Large Blue was dependent on a range of ant species. They had seen the larvae collected by many species of ant, and they had successfully raised larvae using several species, the only failure being with *Lasius flavus*. The lasting legacy of the extinction of the British race of the Large Blue is the realisation that before you attempt to conserve a dwindling species, its complete ecology must be scientifically worked out and fully understood. That this realisation came too late for the Large Blue is a salutary lesson, but will ensure effective conservation for any other butterfly in the same boat.

## **FLIGHT TIMES**

### **(a) Time of Year**

Figure 1 shows the distribution of the 220 fully dated Cornish records which have been located, grouped into six-day periods. The records extend from 7th June to 15th August, a range of 70 days.

Emmett & Heath (1989) gives the flight time as 20th June to mid-July. Whilst only 5 records (2%) are earlier than 20th June, 50 (23%) are after 15th July. This suggests there is a later emergence in Cornwall, with records spread out to mid-August. Each butterfly has an average life for of just 4 or 5 days, so emergence from pupae in Cornwall can go on well into August. Such late insects may not find food plants for their larvae, as thyme will be in full flower, or over, by then.

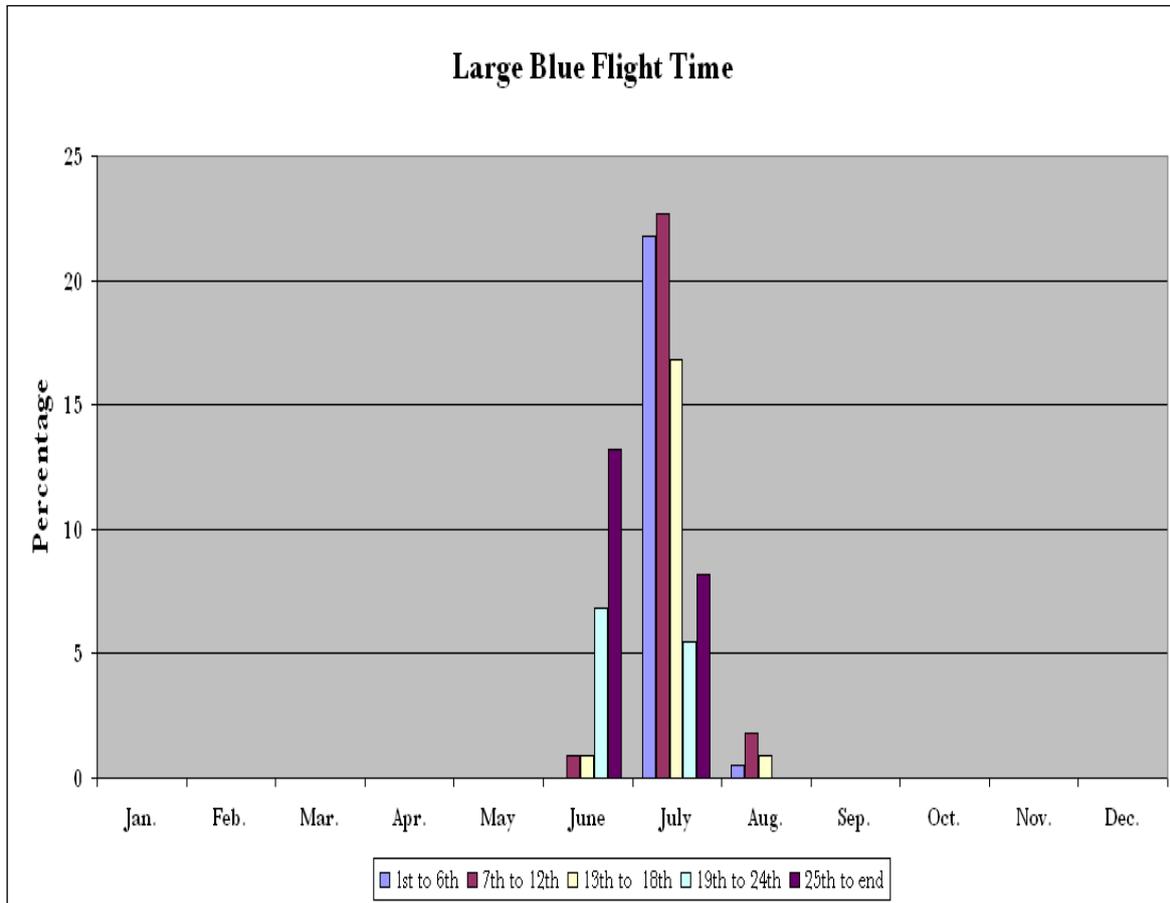


Figure 1: Large Blue Flight Time

These are the earliest dates:-

<u>Earliest Date</u>	<u>Recorder</u>	<u>Location</u>
7th June 1906	Peed, J	Millook
12th June 1975	Archer-Lock, A	Tidna
18th June 1896	Abbott, P. W.	Prob. Millook
18th June 1905	Peed, J.	Millook

These are the latest dates:-

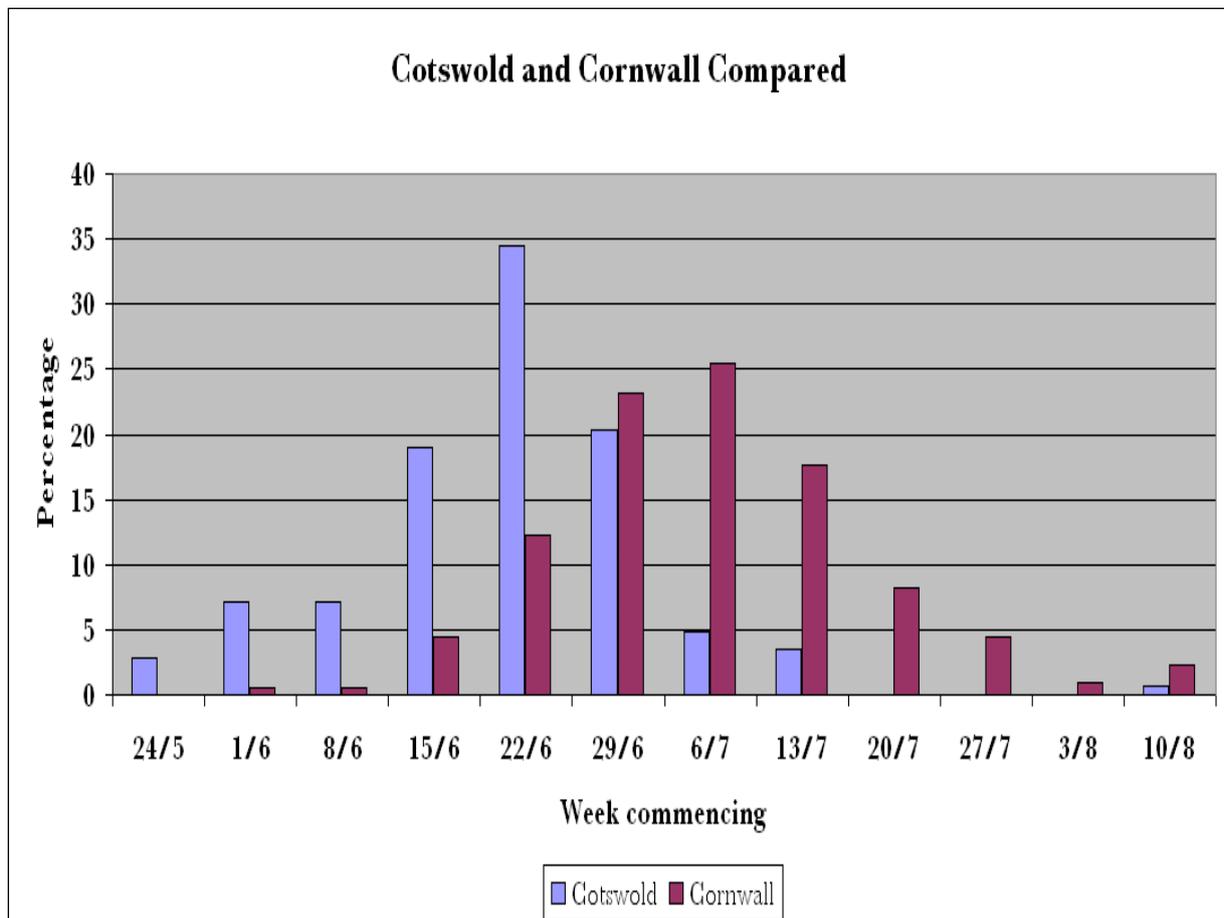
<u><i>Latest Date</i></u>	<u><i>Recorder</i></u>	<u><i>Location</i></u>
11th August 1919	Disney, A. W. M.	Nr Boscastle
11th August 1968	Heslop, I. R. P.	Minack Head
12th August 1903	Rollason, W. A.	Millook
13th August 1903	Rollason, W. A.	Millook
15th August 1902	Frohawk, F. W.	Millook

### **(b) Comparison with Cotswold Large Blues**

Frohawk recorded that Large Blues from Cotswold sites flew earlier than those from Atlantic coast sites. Figure 2 compares the date distribution of 142 fully dated Cotswold records with that of the 220 Cornish records. On average, Cornish Large Blues fly 15 days later than Cotswold ones (average date Cotswolds = June 24th, Cornwall = July 9th). The cooling effects of the Atlantic Ocean on the adjacent south facing slopes probably cause this delayed flight time in Cornwall. In spring, the typical sea temperature is around 14-15° C (57-59° F), and prevailing onshore winds will counteract the warming influence of the sun. Additionally, in spring and early summer the north Cornish littoral fringe can often be covered in a sea mist, to further reduce warming by the sun. These cooler conditions may lead to slower larval development in Cornish coastal sites than in the Cotswolds. Early problems with the attempted re-introduction at a Cotswold site led to speculation that the Cotswold race may have had a two year life cycle. As that race is extinct, this can never be proved, but it may have been that the Cornish race was actually 11½ months earlier in emerging.

Cotswold dates range from 24th May (the earliest record for all Europe) to 19th July. There is also one exceptional later date of 11th August by a teenage Russell Bretherton in 1921. Avoiding this exceptional date, the flight range is 57 days, but 56% of records fall in the peak twelve days from 19th to 30th June. This compares with a Cornish range of 70 days with 44% falling in the peak twelve days from 1st to 12th July. These figures confirm Frohawk's assertion that flight on the Atlantic coast is more extended than in the Cotswolds.

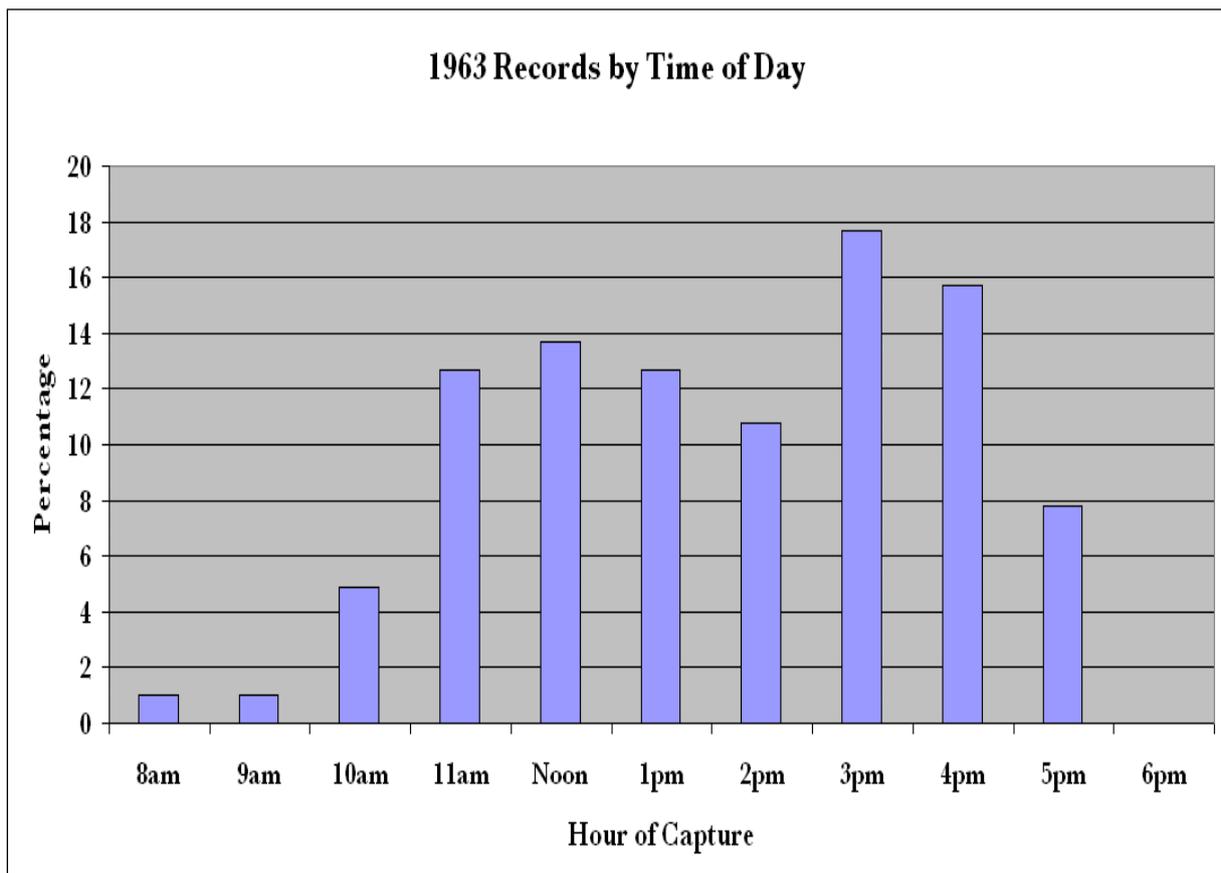
In his 1974 paper on Cotswold Large Blues, John Muggleton observed that records from the 25 year period 1926 to 1950 exhibited earlier flight times than in the previous 25 years (average date 1926-1950 = June 19th, 1901-1925 = June 29th). Records for 1859 to 1875 were similarly earlier than 1876 to 1900 (average date 1859-75 = June 16th, 1876-1900 = June 27th). Contemporary entomologists had noted this earlier emergence during these years. The change in flight times coincided with periods of higher average temperatures with more sunshine.



*Figure 2: Cornwall and Cotswold Flight Times Compared*

There are no fully dated Cornish records prior to 1895, but in the 20th century the recorded dates show no significant tendency for earlier flight times between the two 25 year periods 1901-1925 (average date = July 10th), and 1926-1950 (average date = July 9th). Although the years of the early thirties, particularly 1933, were warm and would have been the high point in terms of numbers of Cornish Large Blue, there has never been a suggestion of any earlier emergence during these years. It seems most likely that the cooling effects of the Atlantic Ocean and coastal mists would mask higher air temperatures during 1926 to 1950.

**(c) Time of Day**



*Figure 3: 1963 Records by hour of capture*

Some recorders have commented that flight is restricted to certain times of day. In Hunt's 1963 report he noted the time of capture of his specimens. Figure 3 tabulates the hour of capture for the 102 specimens taken and released that year. This shows that butterflies can be found throughout the day, with most between mid-morning and late afternoon. The slight dip between noon and three may simply be attributed to less recording whilst Hunt stopped for lunch. The earliest seen was at 8.45am, and the latest was at 6.05pm. In his report he commented that 1963 suffered from poor weather and low sunshine, and his own limited impression was that Large Blues tended to appear with the sun, often disappearing into thick cover from which they were difficult to evict.

*Part Four to follow in the next newsletter*

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## **Christmas Greetings**

The Trustees of Cornwall Butterfly and Moth Society would like to wish all members and friends an enjoyable Christmas.

Cornwall Butterfly and Moth Society: Charity registered in England (1160409)

Registered Office: Trelusback Farm, Penhalvean, Redruth, Cornwall TR16 6TQ