

**The Occurrence of the
Large Blue Butterfly (*Maculinea arion* L.)
in Cornwall**
(written July 2001)

*plus its Occurrence in North Devon (written October
2003) and a selection of historical reports*

by
Malcolm Lee



Re-introduced Large Blue in Cornwall 25th June 2001
Photo: Malcolm Lee

*What was scattered in many volumes and observed at several
times by eye-witnesses, with no cursory pains I laid together,
to save the reader a far longer travail of wandering through so
many desert authors.*

JOHN MILTON, preface of
A Brief History of Muscovy,
first published 1632.

**Malcolm Lee
Gullrock
Port Gaverne
Port Isaac
Cornwall
PL29 3SQ**

Tel: 01208 880106

e-mail: gullrockportgaverne@btinternet.com

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

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

INTRODUCTION

25 years since its extinction in Cornwall, the Large Blue is set to return to those coastal valleys which for so long had been its stronghold. It was always a rare butterfly, surrounded by secrecy. Published papers are invariably without location data, and what little detail has been recorded is hidden away in confidential reports. Whilst the butterfly survived, such caution may have assisted its protection. Since extinction, much of the secret information has only historical value. The time is ripe to record the story of this intriguing insect for future generations.

THE EARLY YEARS, AND THE FIRST CONSERVATION ATTEMPTS - 1891 to 1918

In the last quarter of the 19th century, Britain's rarest resident butterfly was the Large Blue, which appeared on the verge of extinction. It had disappeared from Northamptonshire in the 1860s, and had dwindled to vanishing point in both its former strongholds of the Cotswolds and Bolt Head in South Devon. Some time around 1880, the Dorset entomologist C W Dale found the Large Blue in abundance near Clovelly. Dale published this location in his part work *The History of our British Butterflies*. That section covering the Large Blue came out in 1887, which may have prompted the search along other parts of the Atlantic coast, including Cornwall.

The North Cornish coast was then a very remote place. The nearest railway station was in Devon, at Holsworthy, with a horse drawn coach to Brendon's Hotel (later The Falcon Hotel) in Bude. The 11am Express from Waterloo got to Holsworthy just after 5pm, and the waiting coach was scheduled to arrive in Bude at 6.30pm. The North Cornwall line reached Camelford in August 1893, and the Holsworthy line was extended to Bude in August 1898, opening up this area of the coast to visiting entomologists who could afford the fare. A first class summer tourist return from Waterloo to Bude was £3.6s (£3.30), and even third class was £1.15s.9d (£1.79), at a time when a reasonably paid labourer could expect 18s (90p) a week.

F W Frohawk's memoirs, written in the early 1940s, record the finding of the first Cornish Large Blue by his friend E A Waterhouse in July 1891. Waterhouse related to Frohawk that he liked staying in unfrequented parts of the country and on arriving at a rural spot south of Bude (Millook) he put up at the only available cottage. That night he dreamed of catching three Large Blues and the following morning, which was dull and wet, he did - an amazing coincidence! He subsequently found they were abundant in the area. In the 1906 Victoria County History, James Clark gives a different story, recording its discovery 'at the close of the eighties by Messrs Waterhouse'. This was presumably a reference to both E A Waterhouse and his brother E O Waterhouse, a respected entomologist at the British Museum. The first Cornish Large Blues were exhibited by E A Waterhouse at the Entomological Club meeting in London on December 11th 1891. This supports the 1891 discovery date, as such rare butterflies would surely have been shown at the first opportunity, and suggests Clark was in error. Word of Waterhouse's location spread. Herbert Goss recorded them at Millook in the first week of July 1892, and G C Bignell collected a series in June 1893 labelled 'Poundstock', the parish in which Millook is situated.

At the end of June 1893, Herbert Goss showed the Large Blue to be abundant in several localities between Bude and Boscastle, doubtless by just walking the coastal path. These probably included the sites around Crackington, Millook, and Widemouth. At the May 1896 meeting of the Entomological Society, Goss volunteered that

the Large Blue 'was distributed over a much larger area in the extreme south west of England than was generally supposed'. From Crackington to Widemouth is barely 4 miles, so perhaps Goss had received reports of its occurrence further north, between Bude and Clovelly. Having searched and found it in the valleys south of Bude, it would have been an obvious move to extend the quest into the similar topography to the north.

In 1906, Clark recorded that the Large Blue was 'establishing new colonies about Tintagel and beyond'. This butterfly is not a great wanderer, although wind may carry it some distance. The steep sided combes of North Cornwall, coupled with a prevailing wind invariably blowing inland and up the valleys would preclude expansion along the clifftops. Establishment of new colonies by natural means therefore seems unlikely. The answer probably lies in the practice of collectors 'turning out' surplus insects on likely sites. Clark was supplied with much Large Blue information by Goss, whose own 1902 article records 'It was satisfactory to find it in two or three new localities, in one of which I had "turned out" many females in 1896'. Perhaps it was Goss who established the colonies about Tintagel, a forerunner of the activities of the Large Blue Committee!

Many people visited North Cornwall at this time in search of the Large Blue. G T Bethune-Baker collected a long series in 1896, and demonstrated how much brighter were the colours of Cornish specimens over those from the Cotswolds. Dealers were here too. Despite increasing supplies, the sale price was still high. In July 1895, a lot of eight specimens fetched two guineas (£2.10), a sum that would then have bought three pairs of good walking shoes. Russell James, writing in 1901, recorded a dealer supplying nets and boxes to a local boy and asking him to send all he could catch. Some local landowners were very sympathetic towards the butterfly. W A Rollason relates one local farmer's tale of meeting a collector who volunteered that he had caught over 500 butterflies that season and had taken many more in previous years. The farmer's reply was "If I ever catch you on my land again I promise you a taste of powder and shot".

It is nice to record that such sympathies towards our butterflies can still be found in the landowners of Millook. In July 2000, the author was checking out old records for the High Brown Fritillary there, which necessitated an early morning start, and the carrying of a net to inspect the undersides of any 'Dark Green' Fritillaries seen. The valley path was alive with Meadow Browns and Gatekeepers, with the usual good numbers of Silver-washed Fritillaries, and several Purple Hairstreaks were down from the treetops to feed on the bramble, but no Dark Greens. "Don't catch my butterflies" came a loud voice from over the hedge "Leave those free spirits in peace". The farmer was suitably mollified when my quest was explained. He had spent all his life there, and remembered visiting entomologists from before the war, but had never seen the Large Blue himself. He may well have been a descendent of Rollason's farmer.

In 1895 F W Frohawk paid the first of many visits to North Cornwall in his determined quest to solve the mystery of the Large Blue's life cycle. At that time, no one had found larvae older than third instar - they just seemed to disappear. Frohawk used to stay at Trebarfoote, Millook, the home of the Reverend G Upton Allen, another enthusiastic amateur entomologist. He could not have chosen a better location for his study, as less than an hour's circular walk from Trebarfoote would have passed the colonies at Bridewell, Millook Common, Bynorth Cliff and Canceleave antimony levels. A slightly longer walk would have brought him to the colonies at Dizzard, Castle, Penkenna or Cam Draught to the south, or Wanson Mouth and Widemouth to the north.

A few years earlier, in 1890, Frohawk had personally commenced the rearing of every species of British butterfly. This research was later to form the basis for his monumental work *Natural History of British Butterflies* published in 1924. In late July 1895 and again in 1896 he visited Cornwall to obtain eggs and larvae in the hope of rearing them. Like all before, he failed. He returned in 1900, 1901 and 1902. In 1903 he speculated on a link between the Large Blue and ants, after noticing ants' nests were present under every patch of thyme visited by the butterflies, but he had no proof. In July 1905 he returned with his friend A L Rayward. On 12th July they found a pupa on the surface of the ground in a shallow depression under a gorse stem, which suggested the larva might actually feed on gorse in its later stages. They needed to find that final instar larva.

The following June they returned to the exact locality to undertake a painstaking search of every particle of growth and surface of the ground. A day and a half searching, plus a night-time hunt by lamplight proved fruitless. If the larvae did feed on gorse, all this searching would surely have found them. They then decided to explore all the most likely ants' nests, knowing the larvae had to be somewhere in the vicinity. On 3rd June 1906, after much lengthy digging and shaking out nests, their patience was rewarded with a plump grub like larva, and then a further three fell from that same small nest. After finding four in one nest, they set to with vigour but, despite examining a great number of nests, they never found another larva. Frohawk was able to confirm that, although it had grown from 3mm to 14mm since the previous summer, surprisingly, it had not moulted. They had proof of the link with ants, but still needed to know on what it fed. That was to take a further 9 years to establish.

This detail was discovered by Dr T A Chapman. On 14th May 1915, Chapman pulled up some plants over a nest of *Myrmica scabrinodis* var. *sabuleti* and discovered a Large Blue larva, which was damaged in the process. The larva was dying and so could not be studied to see what it would eat. Chapman decided to investigate the gut content to see what it had most recently eaten. This microscopic investigation showed the presence of indigestible hairs and jaw fragments, giving confirmation that the larva was feeding on ant grubs. It had taken two decades of research to discover these unexpected secrets of the Large Blue's life cycle. However, a further 60 years was to elapse before it was finally recognised that a key ecological feature had been overlooked. This omission was to have the most serious consequences for the preservation of this rare butterfly.

Nature conservation in the UK took a major step forward in May 1912 when Charles Rothschild convened a meeting to set up the Society for the Promotion of Nature Reserves (SPNR), later to become the Wildlife Trusts. Membership was by invitation only, and was to be regarded as an honour. The membership list, reflecting the strong interest in natural history by the leaders of society, was a veritable who's who of the great and the good. It included no less than 52 Fellows of the Royal Society, two future Prime Ministers (Stanley Baldwin and Neville Chamberlain), a former Foreign Secretary (Sir Edward Grey), and the Speaker of the House of Commons, James William Lowther (later Viscount Ullswater). J W Lowther was President of the SPNR from 1915 to 1931 and chaired many committee meetings at the Speaker's offices in the House of Commons. Charles Rothschild had started a high powered committee indeed.

The society's aims were set out in a leading article in *The Times* of 18th December 1912, undoubtedly drafted by Charles Rothschild. It pointed out the continuing urbanization of our countryside and stressed the need to preserve the '*last relics of unspoiled nature ... replete with their old native flora and fauna*'. It was recognised that rare plants and animals could not simply be moved to new areas, and that it was the places which needed preserving. Protection of their homes would lead to the preservation of rare species. The article went on to say that '*the only effective method of protecting nature is to interfere with it as little as possible*', an argument

finding few, if any, adherents today. It was not then realised how even our wildest places had been shaped by man's activities, and natural succession by 'letting nature take its course' could destroy a precious habitat and its distinctive species as surely as a bulldozer.

One of the earliest tasks for the SPNR was to draw up a list of places worthy of protection, including some Large Blue sites. The executive committee's job was made easier by the use of a standardised questionnaire for each site being proposed. Many of the suggestions for reserves were those of Charles Rothschild, including two for the Large Blue, one in North Cornwall and one around Hartland in North Devon. The questionnaire for the North Cornwall site merely refers to 'One of the Coombs between Bude and Boscastle', although on the accompanying one inch to the mile Ordnance Survey map someone has placed crosses alongside the name *Crackington Haven*.

The actual site was to be decided by F W Frohawk, as a note on the questionnaire in Charles Rothschild's hand says '*Mr Frohawk should be asked to advise and fill up this paper, he proposes to visit the spot in July of this year*' (1913). The clue as to which site Frohawk suggested comes from the land ownership details given on the questionnaire. The proposed reserve was owned by C G Jewell of Coombe Barton, Crackington Haven, and the only south-facing valley side on Coombe Barton land was the slope of Penkenna, overlooking the haven. Given the traditional secrecy surrounding Large Blue sites, the choice of the most accessible site in the area is surprising when compared to the more secluded Dizzard or Castle valleys to the north. Perhaps it was felt that, compared to nearby Millook, the Crackington area was relatively unknown. In any event, the committee meeting of 14th November 1913 deferred further action on this site, possibly for fear of drawing attention to it.

In 1914, Charles Rothschild visited eight sites in Devon and Cornwall, including Crackington Haven, and the SPNR minutes record he used '*every means to induce the local landowners to assist in acquiring them as reserves*'. The society had expected landowners to be most accommodating, anticipating that the more wealthy would make generous arrangements and donations. It was to be continually disappointed by the unwillingness of landowners to dispose of a part of their land, however worthy the cause. It was never intended that any reserves be held by SPNR, but rather by the National Trust. This had been set up less than 20 years earlier as a charity to preserve places of natural beauty, and whose property rights were made inalienable by statute. It was to be disappointed in these expectations also. Possibly it overestimated what could reasonably be expected from a fledgling organisation which then had a membership of fewer than 500. The trustees of the National Trust also had their own opinions on what constituted 'a place of natural beauty', and sites which they considered of interest only to naturalists might not fit their criteria.

Despite the high powered nature of its committee, the SPNR never fulfilled its promise. Only two years after its foundation, the coming of the First World War brought nature conservation to a full stop. Charles Rothschild, the driving force behind the society in terms of enthusiasm, influence and finance, caught encephalitis towards the end of the war, which led to his early death in 1923. His absence in those crucial post war years dealt the committee, and the whole cause of UK nature conservation, a very heavy blow.

THE INTER WAR YEARS - DECLINES, AND FURTHER CONSERVATION ATTEMPTS

There was a let up in collecting during the First World War, but Large Blue numbers declined. Thousands of specimens were taken annually before the war, but this was unlikely to have been the root cause of the decline. Just six years after its original discovery at Millook, the major part of one strong colony was lost as Millook Common was enclosed and ploughed. George Oliver visited Millook in 1900 and in 1911. When he revisited in 1920 he was

struck by the change. During his first visit he could get about any of the hills in comfort, but in 1920 most of the ground was overgrown with dense masses of gorse, bracken, bramble and heather, such that it was impossible and too painful to wade through. The thyme had been choked out, and numbers were down to only 20% of 1911 numbers. It seems likely that the shortage of farm labour, both during and after the war, meant these marginal lands could no longer be worked, and they were abandoned. The post-war agricultural depression ensured they remained abandoned.

In 1925, the Entomological Society set up the Committee for the Protection of British Lepidoptera (CPBL) [renamed the Standing Committee for the Protection of British Insects (SCPBI) in 1931]. The aims of the CPBL included the introduction of threatened species into new districts and also to create reserves when suitable land could be obtained for this purpose. At its first meeting on 25th September 1925, threatened species were discussed and the Large Blue was top of the agenda. To gain publicity, the CPBL published articles in *The Times*, and it may have been one of these that stung Percy Bright to respond to the suggestion that over-collecting was the cause of scarcity of the Large Blue at this time. Like George Oliver, he pointed out that a very vital change had taken place, especially around Millook, in that gorse had grown up, choking out the thyme and driving away the ants. He felt this could fully account for its scarcity.

In its first few years, the CPBL tried hard to acquire a reserve. They looked at similar sites to the SPNR, with an attempt to purchase a locality near Hartland Point in Devon, which fell through, as did another at Millook. Like the SPNR it seriously overestimated the willingness of landowners to sell a small part of their land, however worthy the cause. Eventually, through the efforts of Alfred Vander Hedges - one of the foremost breeders of British lepidoptera, it found a landowner who was prepared to offer a four-year lease on the large valley site at the Dizzard in 1930.

The committee clearly wanted to distance itself from the running of the reserve, as it insisted that business be done in the name of Mr Hedges, rather than the Entomological Society. To warn off collectors, it paid for a 'watcher', a local blacksmith called Ern Gliddon. He was paid a weekly wage of 36 shillings (£1.80) for an 8am to 6pm seven-day week during the period 20th June to the end of July. The total policing cost in 1931 was £13.19s.4d (£13.97). That year the watcher turned away 12 to 15 collectors. Frank Labouchere, a Dutch butterfly conservationist living in Britain, reported to the committee that the watcher was a thoroughly conscientious and reliable man who lived at the nearby farm in sight of the Dizzard. In 1934 the lease was renewed for a further 7 years at an annual cost of £12.

The merits of putting up notice boards around the site took up a lot of committee time. Some thought they merely drew attention to the locality. Those in favour of notices won, as five boards were erected in 1931. No mention was made of the Large Blue, just a warning that 'Insect Collecting is Strictly Prohibited'. There was a great deal of discussion about the management of the reserve, with conflicting views on whether to graze, burn, or just do nothing and 'let nature take its course'. The latter option was the considered view of the SPNR, many of whose members were also on the CPBL. One member of the Entomological Society recommended not cutting vegetation in the reserve. He considered the thyme which grew below the gorse provided better shelter for the larvae, perhaps thinking of Frohawk's comment in his recently published book '*The species also very frequently deposits its eggs on thyme growing in more sheltered positions under the protection of furze...*'. It seems that the SPNR view prevailed, although the watcher was given instructions to keep the grass cut around the anthills.

In July 1935, Labouchere visited the reserve and was greatly disappointed. No burning had been done since it had been leased to Mr Hedges, with the result that the ground was choked with grass, bracken and gorse 3 to 5 feet high. In an eminently practical

approach he spoke with the farmer, Mr Heal, about former site management, and was told that it had been his practice for a portion of the valley to be burnt each spring. In his report, Labouchere recommended that burning be carried out the following spring, but this was not done. At the April 1936 committee meeting, it was reported that Mr Hedges intended visiting the Dizzard and raised the possibility of purchasing the valley outright, with a view to it being held by the SPNR. In the light of this development, it was decided to take no further action for the present. Yet again, the overestimation of the willingness of landowners to sell meant the suggested purchase came to nothing. With no management the butterfly eventually died out. Labouchere recorded the last confirmed Large Blue here with a singleton on 10th July 1939, none having been seen the previous day. The view expressed at the time was that the butterfly had been 'killed by kindness'.

In its early years, the CPBL was concerned over what appeared to be deliberate attempts to exterminate the Large Blue in Cornwall. In 1930, W G Sheldon told the committee that he understood that efforts were still being made to exterminate the species. Committee members reported that they had seen evidence of deliberate destruction, with damage to the anthills in which they believed the larvae were living. There was even a suggestion that one member of the Entomological Society (enigmatically referred to in the minutes as 'Mr X') had a hand in this destruction in order to increase the rarity, and thus the value, of Large Blue stocks he held.

Frank Labouchere investigated those reports of razed anthills. He found one site '*trampled down in all directions, cigarette ends and match ends were scattered about, but the worst feature was that those ant-hills which were visible had been systematically opened up for pupae - the tops had been cut off and were lying alongside*'. His conclusion was that 'Mr X' was unlikely to have been involved. He would have had too much to lose and, with no really large stock, any price rise would hardly compensate for the amount of ill will engendered.

It seems likely that what was being observed were the visible signs of pupa hunting, rather than attempts at deliberate extermination. At this time, it was a common enough practice for collectors needing the perfect specimen to obtain pupae, as even a freshly emerged Large Blue would have been rubbed by crawling through the ant colony's narrow galleries. Such events had been anticipated at the Dizzard Reserve, as the watcher was given instructions to stop pupa digging. In any event, these acts of vandalism would not have resulted in finding any pupae, as it is now known that Large Blue larvae do not survive in those grass mound nests of *Lasius flavus*.

There were still a great many collectors visiting North Cornwall. Labouchere ascertained who had been collecting in 1935. The owner of the cottage at the foot of Millook hill told him some of the names; Messrs Snell, Sutton, Sills, August, Colonel Wood, Bartlett, Rosborough and Greenwood. Sutton and Greenwood were reported to have been in the area for three or four weeks and had collected assiduously. Mr Greenwood, a collector/dealer from Bristol, worked with an assistant and was reported to make no secret of taking large numbers of any insect if it had a market value. Ian Heslop, who also lived at Bristol and knew him, told Labouchere that some years earlier Greenwood took as many as 600 Chequered Skipper, another scarce British butterfly.

The early 1930s saw a series of warm summers, and Large Blue numbers hit their peak in 1933. Baron Charles de Worms visited North Cornwall on 23rd June 1933 and found the butterfly abundant. He also observed a colony on the coast 'near Camelford'. In his 1933 address as President of the South London Entomological and Natural History Society, de Worms reported '*I am glad that from personal experience I can also say that *Lycaena arion* is distinctly on the increase in its two western headquarters and in places where it is not protected*'.

There is surprisingly little evidence that localities north of Bude

were known about during this time. Labouchere went to Marsland Mouth during his 1935 visit and saw two Large Blues on 28th July. His report also mentions that he had not had time to explore the combs between Marsland and Bude. It seems reasonable to assume he had received some information on other sites north of Bude which, had time permitted, he was expecting to check. Baron de Worms returned to North Cornwall on 12th July 1939 for two days. He found no Large Blues, possibly due to bad weather, but recorded that Graylings and Dark Green Fritillaries were as numerous as ever.

THE IMMEDIATE POST WAR YEARS - 1946 to 1962

The lease on the Dizzard Reserve lapsed in 1941, and world events relegated the plight of insect conservation. The war did not diminish Mr Greenwood's activities, or his customers' desires, as he visited North Cornwall in July 1943, presumably to top up his stocks. With the end of the war in August 1945, plans were made by the SCPBI to check up on the Large Blue's status. Petrol rationing continued until well after the war, and special permission had first to be obtained from the Ministry of Fuel for the trip. Miriam Rothschild, who was working at the Plymouth Marine Laboratories, volunteered to go. In the event, her colleague Malcolm Spooner went, accompanied by Freddie Russell. They visited on 23rd June and 14th July 1946. On neither day was the weather ideal and they saw no Large Blues at Dizzard, nor at other sites visited, all south of Bude.

As Malcolm Spooner clearly acknowledged in his report, he had no experience of the Large Blue. Nonetheless, his 1946 visit report was most influential, as it shaped the SCPBI's thinking on Large Blue conservation. The main finding in his report was a negative one - he saw no butterflies at any of the sites visited. He found the Large Blue slopes difficult to traverse with such a thick growth of scrub, and considered it impossible for even quite intensive collecting to eliminate an insect that flew over such territory. He felt the former reserve at Dizzard was capable of providing no better sanctuary than anywhere else along this coast, and there were many miles of similar coast and valley which provided an almost continuous belt of country capable of supporting a scattered population of Large Blues spread more or less continuously. He questioned whether it was much use attempting to protect any particular piece of ground, and concluded that, for the time being at least, the whole matter of conserving the Large Blue in Cornwall was not one of urgency as the insect had ample natural sanctuary (even if this was growing less), and there was time in hand to acquire more information about it. He recommended that someone staying on the spot and working continuously at the height of the season obtain these facts.

Despite Spooner's negative findings, the committee did have a report that year of the Large Blue's continuing survival. Canon T G Edwards told the SCPBI that the Large Blue still existed in '*six separate unfrequented valleys from Crackington to Clovelly, a distance of 35 miles*'. He did not name the valleys, but a few years later he was holidaying near Clovelly and invited Stanley Wakely to join him. Wakely reported being greatly excited to see his first Large Blue over the border in Cornwall, although he also did not name the sites. Locations given for other species confirm he visited Coombe Valley, Morwenstow (probably meaning both Tidna and Morwenstow Valleys), Marsland, and Hartland in Devon. These were almost certainly five of the six valleys. Castle Valley at Crackington was undoubtedly the other. This is visible from the fine church at St Gennys, which the Canon would have visited to satisfy his ecclesiastical interests, and the adjacent valley would have been inspected to fulfil his entomological interests.

Captain R A Jackson was chosen to obtain the detailed information Spooner had recommended be sought. He briefly visited the area in 1947, and in 1948 spent 12 days between 29th June and 10th July walking the coast from Tintagel up to Hartland in Devon. The weather during his visit was uniformly bad, generally windy and

cloudy. On the sunny days, a north-westerly gale was blowing. He was greatly helped by a site map of an earlier survey by W G Sheldon, who had first visited North Cornwall in 1895. Sheldon was a founder member of CPBL and had died in 1943. His map has not been located, but Jackson's report identified the sites, all of which were south of Bude. Jackson found several Large Blue colonies in Devon, but in Cornwall butterflies were only found at Yeol Mouth. Inexplicably, he omitted to visit the valleys at Tidna or Morwenstow, despite their relatively easy access. Both were subsequently shown to be excellent sites.

It seems likely that butterfly numbers in Jackson's survey were influenced by the poor weather. The following July, in glorious weather, Baron de Worms joined Captain Jackson at Boscastle. On 9th July they toured the localities which held the Large Blue, and noted it was holding its ground well. The specimen de Worms collected that day is labelled 'Bude District', which probably meant around Millook - a location recorded on several of his specimens since 1930.

There was a resurgence of numbers in the mid 1950s. South of Bude, O G Watkins saw several on the seaward side of Millook Common in 1955 or 1956. On 1st and 2nd July 1957, Baron de Worms and R Eldon Ellison reported seeing around a hundred Large Blues careering amongst the bracken in two separate valleys, almost certainly Castle Valley and Bridewell slope at Millook. North of Bude at this time, it was numerous around Morwenstow, Litter Mouth, Yeol Mouth and Marsland Mouth. As had happened before, numbers started to decline and concerns over its future were raised.

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 Epphavan 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 to 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.

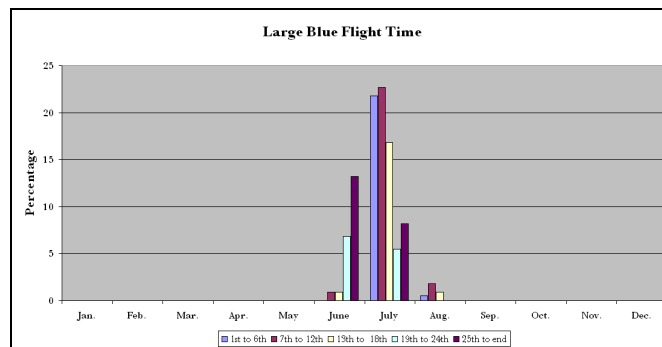


Figure 1: Large Blue Flight Time

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
19th June 1896	Abbott, P. W.	Prob. Millook

These are the latest dates:-

<u>Latest Date</u>	<u>Recorder</u>	<u>Location</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. Recent problems with the attempted re-introduction at a Cotswold site have 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 could have been that the Cornish race was actually 1½ 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.

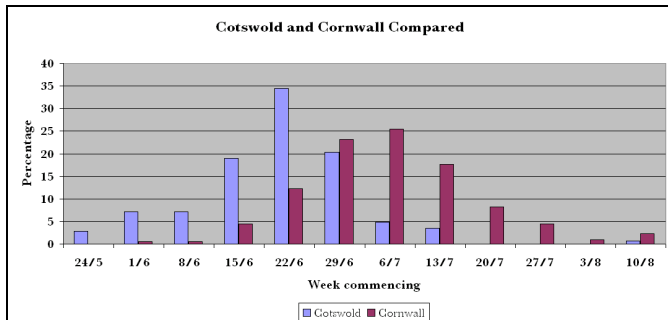


Figure 2: Cornwall and Cotswold Flight Times Compared

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

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.

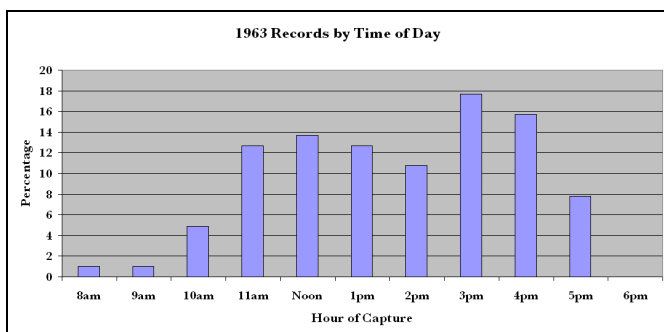


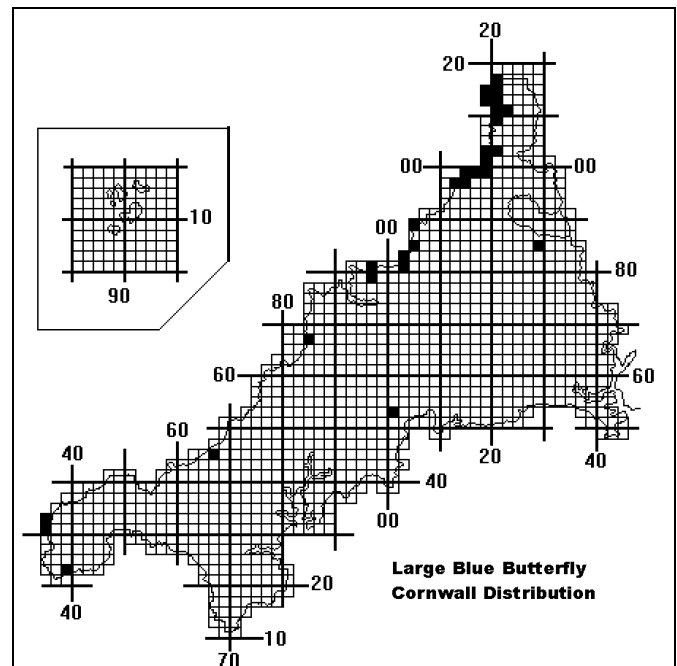
Figure 3: 1963 Records by hour of capture

LARGE BLUE LOCATIONS

The exact locations of Large Blue sites were secrets to be closely guarded, even from friends and fellow lepidopterists. F W Byers, writing in 1964, recalled being splendidly entertained by Colonel Rossel at Bodinnick, with collecting excursions and trips in his boat. Byers decided to reciprocate with lunch and collecting on Bodmin Moor. During the lunch break, the Colonel enquired whether they were near Large Blue country. Byers vaguely suggested they were

'many miles away', hoping this would end the matter, but Colonel Rossel kept coming back to the subject. Eventually, as he had been so very decent, Byers pledged him to secrecy and they started off on the long trek. On arriving at the unnamed location, the Colonel netted a fine specimen within a few minutes. He then packed away his net remarking 'I shall only take one, this has made my day'. Frank Smith now has Colonel Rossel's collection, and the single Large Blue is labelled '16th June 1960, Hartland Quay N. Devon'.

With the passing of a quarter century since its Cornish extinction, site information is now of historical interest only and should be recorded before it is lost. In published accounts, Millook is almost alone in being named. From the unpublished information, the Large Blue has been seen in virtually every coastal valley from north of the Camel Estuary right up to the county boundary, and, in Devon, continuing to around Clovelly. For the few remote valleys with no information, this may be the result of records not coming to light, rather than the Large Blue's absence. Outside of its metropolis, there are old records from other parts of Cornwall, including the south coast. It is easy now to dismiss these sightings, particularly when made by inexperienced recorders, but the coastal habitat will have greatly changed since the turn of the century. We know from contemporary accounts that Millook in the 1920s was very different from the 1890s, and presumably other parts of the coast fared as badly. These colonies may have become extinct before anyone else could confirm their presence.



Large Blue Butterfly tetrad (2km x 2km) distribution in Cornwall

NORTH CORNWALL COAST

This was the stronghold for the species. During its heyday in the early 1930s, far from being rare here, a walker along this coast in early July may well have concluded that the Large Blue was the most abundant blue. As late as 1957, Baron de Worms saw about 100 flying in just two valleys, and in 1964 Owen Hunt saw around 70 at Tidna. By the mid 1970s numbers had been reduced to extinction, and by 1979 the last UK colony, on Dartmoor, had gone. These are the known sites, together with their 1km OS references, going from south to north.

SOUTH OF TINTAGEL: Very little is recorded of these sites, and it seems few knew about them, but there is no doubt the Large Blue was present. James Clark in the 1906 Victoria County History hinted at the area, with his reference to sites at 'Tintagel and beyond', probably from information supplied by Herbert Goss. Several of these sites are remote and would then, as now, have been rarely visited by casual walkers.

Epphaven Cove (SW 9679) and Trevan Point (SW 9680): Christopher Cadbury advised Simon Ford, the local National Trust Countryside Manager, that he had found the butterfly here before the war. Epphaven was long known as Rabbit Valley, with very close cropped turf. Owen Hunt appears not to have known of this earlier record, but in an appendix to his 1963 report he refers to two 'highly probable' sightings by experienced observers, Mr & Mrs O G Watkins. Their field notes for 21st July 1963 show '*Brilliant day, ideal conditions. One specimen nearly netted at Epphaven, and another seen at Trevan Point.*' A footnote records '*This Port Quin area has acres of thyme, an ideal condition, with many ants. I am almost positive of the identity, but had only one swipe with the net as No. 1 passed by and shot over the cliff.*' Hunt visited Lundy Bay and Epphaven on 19th August and was much impressed by the apparent suitability in respect to the abundance of thyme, which reached a notable peak at Trevan Point. There it carpeted the ground as the dominant vegetation over a large area, far exceeding anything met with in areas north of Tintagel. In this heavily thyme clad area, he found a flourishing colony of *Myrmica sabuleti* under a stone. Had Hunt known of prior records here, he would undoubtedly have undertaken an earlier and more thorough investigation, and upgraded this record. Hunt also inspected the area in 1964, but found nothing. There were visits in 1965 and 1967, but still nothing was seen. Reports for these latter two years show visits to 'Port Quin (Doyden Point) and Epphaven Cove', but the reference to Doyden Point was most likely a simple error for Trevan Point.

Lower Hendra (Barrett's Zawn) (SX 0281): Large Blues were introduced to this location in 1966, in the northernmost valley at Barrett's Zawn, known as Sweetwater Valley. Edmund Hambly, a cousin of Christopher Cadbury, had recently acquired this land, and its seclusion was a significant factor in choosing it for an introduction. On Saturday 9th July 1966, Malcolm Spooner and Peter Crow took four females and two males from the reasonably strong Tidna colony and released them here at about 4.30pm. Graham Howarth visited the site 8 days later on 17th July but saw no Large Blues. Tim Peet visited the site the following year, in most unsuitable weather, but saw nothing. It seems there were no sightings subsequent to the release, so presumably it failed to become even temporarily established. It was accepted that the numbers released were small, so this was to have been expected. The site's history was unknown, but it was felt at the time that it may well have held Large Blues in the past, a conclusion with which it is difficult to disagree.

The older farm workers at Lower Hendra still fondly remember Edmund Hambly. It was recalled with some amusement that he once brought the harvest to a halt whilst he chased, unsuccessfully, after a rare butterfly.

Jackets Point Valley (SX 0382): Owen Hunt visited this site in 1965. No record of visiting the neighbouring steep sided valleys was made, and Hunt's visit was most likely to check out earlier records specific to this site. The remoteness of this steep sided valley probably ensured few entomologists ventured here. *Prima facie*, it seems a most suitable site, and, like other valleys around, may well have held Large Blues into the 1950s.

Backways Cove (SX 0485): In 1933, Baron de Worms found a new coastal site. He later referred to this as 'near Camelford', which must have been west of Camelford, as a coastal site to the north would have been described as 'near Tintagel', or 'near Boscastle'. The evidence points to his location being Backways Cove. This area was known about much earlier, as James Clark's 1906 report of the Large Blue '*about Tintagel and beyond*' could only have been referring to sites SW of Tintagel. The most likely source for Clark's report was Herbert Goss, whose own 1902 report refers to finding the Large Blue that year in '*2 or 3 new localities*'. Having found it abundant between Bude and Boscastle in 1893, these new localities were almost certainly west of Boscastle. Tintagel was one new site, and Backways Cove probably another. It was visited by Owen Hunt in 1965, after a report of a recent pre-1963 record. In 1966, Malcolm

Spooner referred to the butterfly being detected here in 1949, perhaps the same record. Baron de Worms had revisited North Cornwall's Large Blue sites in 1949, and he was undoubtedly Malcolm Spooner's source. On a visit in 1994, Jeremy Thomas commented that this valley reminded him of Tidna in 1972/73.

Tintagel (SX 0589): First recorded in 1896, possibly from specimens 'turned out' by Herbert Goss. There are few warm south-facing valley sides around Tintagel, but the south west slope of Barras Nose may have been the site. Canon H D Rawnsley, one of the founders of the National Trust and instrumental in purchasing Barras Nose for the nation, re-visited here in summer 1918 and described the Barras Headland thus '*... its short turf scorched by the sun where the rock came near the surface, but for the rest green with soft grass, enamelled with great patches of thyme such as I have never seen...*'. This strongly suggests a classic Large Blue habitat. The last confirmed record was in 1933 by Baron de Worms. Captain Jackson recorded no butterflies here in 1948.

BOSCASTLE TO BUDE: This was the traditional metropolis of the Large Blue, with most of these sites known by the mid 1890s. It was this area, particularly around the named site of Millook, to which visiting entomologists and dealers flocked in their hundreds to collect specimens of the Large Blue.

Boscastle: Although frequently referred to as a location, the evidence is not great. The old references to between '*Boscastle and Bude*' could have simply meant those earliest known sites from Cam Draught (at the south) to Widemouth (at the north), using Boscastle and Bude as the largest places near either end. There are two references often quoted for 'Boscastle' - A W M Disney on 11th August 1919 and Baron de Worms on 8th (sic) July 1949. Disney's reference states '*while staying near Boscastle on August 11th, I took a fine specimen of L. arion on the heather on the top of the cliffs: a friend also took three specimens a few days previously*'. De Worms' reference states '*On July 8 I travelled to Cornwall to join Capt. and Mrs R A Jackson at Boscastle. ... July 9 was a glorious day, which we spent making a tour of the localities which still harbour *Maculinea arion*.*' De Worms was not definitely referring to Boscastle, and the butterfly he collected that day is labelled 'Bude District' which probably meant his old haunt of Millook. Disney was only staying near Boscastle, and his description could easily apply to the clifftops around Cam Draught, just 3½ miles away. His comment could be taken as referring to a colony around the Boscastle area, perhaps the harbour valley or Pentargon Valley to the north, but this may not have been so. In Captain Jackson's 1948 report there are no old 'Sheldon' sites south of Cam Draught, and Jackson further stated there were no suitable sites between Tintagel and Cambeak. Hunt did not visit any sites around Boscastle during his surveys in the 1960s.

Malcolm Spooner gave this as a definite site for '*about 1907*', on the basis of a photo from Boscastle at around this date. This had '*arion locality*' on the reverse and crosses on the photo showing where they were taken. Without sight of that photo, it would not be possible to confirm whether it was of Boscastle, or just near Boscastle. In the mid 1960s, Baron de Worms wrote to Spooner about his 1949 visit and said '*about 8th July 1949 seen at Boscastle, apparently*'. The use of 'apparently' confirms it was not his observation, and might be taken as indicating some surprise at the sighting. Boscastle is not an unfrequented place, and the coastal footpath from there to Bude is shown on the 1890 Ordnance Survey six inch maps and probably well pre-dates that, so access was not a problem. Many entomologists must have walked this footpath during the Large Blue flight time, from Herbert Goss and W G Sheldon in the 1890s, right up to the date of extinction, and beyond. On this basis, whilst the possibility of a small short lived colony on Boscastle Harbour slope or Pentargon Valley cannot be ruled out, it is inconceivable that a significant colony would fail to have been recorded.

Crackington Area Sites -

(1) **Cam Draught (SX 1396):** This valley, forming the eastern slope of Cambeak, would have been known to Goss in 1893, and was one of Sheldon's 1895 sites. Labels showing 'Cambeak' or 'Tremoutha Haven' are likely to have been referring to specimens caught in this valley. A V Hedges, in a letter to Mr Griffin, gave the last record here as '1933 or so'. In 1948 Captain Jackson visited Cam Draught and found it had recently been heavily burned with no ants or thyme. Hunt visited the Cambeak area in 1963, and found nothing.

(2) **Penkenna Slope (SX 1496):** This was another site known to Sheldon from 1895 and probably Herbert Goss in 1893. This readily accessible site was the surprising choice for the intended SPNR Large Blue reserve in Cornwall, suggested by F W Frohawk in 1913. Presumably it must have been a significant colony to be chosen as a reserve. When Jackson visited in 1948 he found it 'largely overgrown with gorse and considered an unlikely place now'. Hunt visited the slope in 1963, but found nothing.

(3) **Castle Valley (SX 1497):** This valley, just north west of St Gennys church, was probably known to Goss in July 1893. It was certainly an 1895 Sheldon site, and was a well known location. Many of the butterflies labelled simply 'Crackington' will have come from here. W A Rollason's 1903 'St Gennys' specimens were almost certainly taken here, as were Percy Bright's 1920 specimens. This was undoubtedly the 'Crackington' valley of Canon Edwards from 1946. In 1948, Jackson found it had some thyme and ants at the valley bottom near the sea, although the hillside was heavily burned. He saw no butterflies. On 1st July 1957, Baron de Worms and R Eldon Ellison drove south from the Penhalt Cliff Hotel and visited two unnamed valleys 'south of Bude'. One was at Millook Bridewell (qv), and the other was almost certainly Castle Valley, as all other valleys had long been unsuitable by this time. Here they saw 'a good many' Large Blues. In his unpublished paper, Spooner states that Baron de Worms reported *in litt.* (May 1963) that the species still survived at Crackington. He may have been thinking of the numbers he saw six years earlier, and presumed the colony was still surviving, or he may have received later reports. Hunt checked out Castle Valley three times in 1963. All were negative, but only the visit on 5th July (a sunny day) was within the flight period, and stood any chance of success. In 1964, of all the traditional sites south of Bude, he thought that Castle Valley was the best surviving example with all the requisite features of terrain still present in good numbers. He revisited Castle Valley twice more in 1968, without success.

Dizzard Valley (SX 1598): This site was one of Goss' June 1893 localities 'between Bude and Boscastle', as Clark (1906) attributes to Goss a Dizzard Head record for the Sand Dart moth *Agrotis ripae*. It was also an 1895 Sheldon site. A specimen labelled 'Higher Dizzard' which was collected by S Tuke in 1924 came from here. Known locally as 'Butterfly Valley', this site was leased in 1930 by the CPBL and became the Dizzard Butterfly Reserve. Malcolm Spooner gives the last butterfly in the reserve as a singleton seen on 10th July 1939 by Frank Labouchere, but quotes Rennie Bere's report that the farmer of one of the Dizzard farms had seen it in recent years (c1962). When Spooner visited in 1946, he found the main slope fairly impassable, but did record *Myrmica sabuleti* in the lower zone fringing the sea cliffs, where he also found thyme. He felt the grassy clearings in this area would not support colonies of any size. Jackson found dense gorse, bramble and blackthorn scrub, and just a little thyme and anthills at the exposed seaward end in 1948. When Graham Howarth visited Dizzard in 1953 he also found it very overgrown and unsuitable for the Large Blue. Hunt made four unsuccessful visits here in 1963. He described only a small area of the seaward end as suitable. The National Trust acquired the site a few years later, and in his 1968 paper Hunt reports a much better position. When he visited on 3rd July 1968, he found that scrub was much reduced, with increased thyme which had spread further inland. He felt that, had stock been available, it was in sufficiently good condition to consider re-introduction. Robert Philpott from

Bude, who had had experience of the Large Blue since the late 1940s, reported a sighting on Chipman Cliff in 1974. Speaking of Chipman Cliffs, Rennie Bere advised Tony Archer-Lock in September 1974 that this area was 'so suitable' for the Large Blue. Did a tiny population still hang on near the sea?

Millook Area Sites -

(1) **Bynorth Cliff (SX 1799):** This was one of Sheldon's 1895 sites and probably known to Goss in 1893. In 1948, the local farmer reported to Jackson that the butterfly swarmed on the cliffs years ago, but no longer occurred. This was probably in 1933, when numbers were at their peak in North Cornwall. Jackson found the slope cultivated for potatoes, and no ants or thyme in 1948. Hunt found nothing at any of the Millook sites he visited. His 1963 report does not specify the individual locations, but he must have visited all Jackson's sites.

(2) **Millook Common (SX 1799, SX 1899):** This was one of the earliest sites and would have been visited by Waterhouse in July 1891, as well as Goss and Sheldon. Just six years later, C J Watkins reported that the bulk of the site was enclosed and ploughed up. In 1946 Spooner walked from Sharnhole Point along the undercliff to Millook but found nothing. The Large Blue did hang on around Millook Common, as O G Watkins and a friend saw several on the seaward side of the common one summer about 1955 or 1956.

(3) **Antimony Level Valleys (SX 1799):** These two valleys run inland from Canceave, on the south east side of Millook Common. One valley runs due east, with the public footpath down to Millook Valley bottom, and the adjacent valley, with the old Antimony level, runs south east to Millook Valley. Both valleys were Sheldon's 1895 sites, and would have been known to Waterhouse in July 1891 and Goss in 1893. R P Demuth, writing in 1984, relates how he spent a weeks holiday at Lion's Den, Millook in 1927 and located the main colony at that time on a steep south-eastern facing slope of short grass and thyme and gorse bushes. This description fits the Antimony Level site, which is just above Lion's Den. Just to make certain that no-one missed the spot, the owner had put up a notice 'Do not catch the flies'. Demuth saw no Large Blues that year, although a Mr Tongue took the first one of that season on the day he left. On returning to Millook in early July 1929 he finally caught a Large Blue. A specimen labelled 'Canceave' caught on 2nd July 1932 by S Tuke would have come from here. In 1948 Jackson reported the Antimony levels site as two nice warm valleys but with little hope for Large Blues now. There was very little thyme, and a great growth of gorse and bracken, much impenetrable.

(4) **Bridewell Slope (SS 1800):** The first Cornish record by E A Waterhouse was almost certainly on Bridewell, immediately to the north of the cove and just above the cottage where he would have stayed in July 1891. Evidence from Clark's 1906 Victoria County History suggests that Goss' original 1892 location was on the slopes of Bridewell. Clark records two thyme feeding micro-moths from here, *Pyrausta nigrata* 'among the thyme on the side of Bridewell, Millook', and *Coleophora niveicostella* 'taken on Bridewell, near Millook'. Whilst he did not attribute these records, Clark's introduction thanked Goss for his notes on north coast lepidoptera. This was also one of Sheldon's 1895 sites. It was on the slopes of Bridewell that F W Frohawk spent so much time unravelling the secrets of the Large Blue's life history. Bridewell was probably the best known of all the sites, with direct access from the road. Baron de Worms first visited here in 1929, and intermittently returned over the next 30 years. Frank Labouchere visited Millook in 1935 and saw two butterflies here on 29th July. This was the site which had been 'thoroughly worked, and the area had been trampled down in all directions, with cigarette ends and matches scattered about, and anthills opened up'. In 1948, Jackson stated that the old site was just east of the hill down from Penhalt Cliff. He found the slope was now almost impassable, but there were a few anthills and thyme near the top. He reported that one butterfly may have been seen here in 1947. On 1st July 1957, Baron de Worms and R Eldon Ellison

drove over to an unnamed 'secluded valley south of Bude'. The whole of one slope, covered with thick bracken, was alive with butterflies. Both High Brown and Dark Green Fritillary were in great numbers, and, nearer the coast, Marbled White, Gatekeepers and Grayling were all swarming, and it was not long before they saw Large Blues careering over the bracken. On returning the following day they saw a pair of Large Blues *in cop* on a bracken frond 'as soon as they stopped', so the site must have been adjacent to the road. A valley location which is adjacent the road can only be Bridewell. Hunt visited here in 1963, but found nothing. The farmer, Mrs Burnard, considered that collectors were a particular nuisance in the 1960s, blocking the roads and gateways with their cars. She ploughed up much of Bridewell about this time, to remove the colony and bother from collectors. She also mentioned the butterfly used to fly on adjacent Penhalt clifftops (SS 1800).

(5) Longland Valley (SX 1898): The earliest named reference to this location was in two visits by Owen Hunt in his 1963 survey, both of which were negative. Amongst Hunt's criteria for all the places he visited in 1963 was that they had been former Large Blue sites, so he was probably aware of earlier records from local informants. In Labouchere's 1935 report, he mentioned 'a locality 1½ miles up Millook valley'. The Antimony Levels are little over ½ mile up the valley, so he may have been referring to a different site. The steep west facing slopes of Longland Valley would fit his description. L K Evans recorded the butterfly in 1964 at 'Jacobstow'. This could have been a hitherto unknown inland colony in Jacobstow valley, but the upper reaches of Longland Valley are little over a mile from Jacobstow, and seem a more likely location.

(6) Mill Farm Valley (SX1899): Tony Archer-Lock, writing in 1988, recalled he had been told about a site on a north facing slope, just inland at SX 187997, which was apparently occupied until 1973 when it was destroyed. However, when he cast his land agent's eye over the site in 1974, the impression was that the reclamation was more than a year old. He reported that the butterfly was known locally as the Millook Blue. A necessary prerequisite for any Large Blue colony is the warmth loving ant *Myrmica sabuleti*, and a cool north facing slope seems an unlikely habitat. The opposite south facing slope may have been the more probable spot. Unlike other known sites, this location does not have a public footpath running through it and would not have been accessible to casual walkers who did not have permission to enter. George Oliver referred in 1920 to 'another steep bank (inland) where several specimens used to be taken', and in 1946 Malcolm Spooner visited 'a grass slope (short turf) inland from Millook, facing south, and with a luxuriant growth of thyme'. Both descriptions fit this slope. Spooner saw no Large Blues at any of the sites he visited, in less than ideal weather. Several of his 1946 sites were subsequently confirmed as holding Large Blues, so his negative report from here cannot be regarded as conclusive evidence for its certain absence. Mill Farm Valley is only a few hundred metres inland from the main Bridewell slope, and wind blown strays could readily have colonised a warm short turf slope with luxuriant thyme. In early years, there may well have been a continuous colony stretching inland from Bridewell, becoming more fragmented as the scrub grew. Ian Heslop's diaries record five butterflies taken at 'Millook' on Sunday 22nd June 1969 (specimens 4309 to 4313 - Heslop Collection, Bristol City Museum). As Bridewell had been ploughed up by this date, Mill Farm Valley may well have been his location.

Widemouth Bay Area Sites -

(1) Wanson Mouth (SS 1901): Wanson Mouth was one of Sheldon's 1895 locations, and probably known to Goss in June 1893. Although Jackson found no butterflies here in 1948 he felt this was the best of all the old localities as regards thyme and ants. Hunt searched Wanson Mouth five times in 1963, without success, but all visits were outside the main flight times. He returned here on a sunny day on 5th July 1968, but also saw nothing.

(2) Widemouth Bay (SS2002): 'Widemouth' appears on a number of specimen labels, but some could refer to Wanson Mouth, or Lower Longbeak. Evidence that the Large Blue was at Widemouth Bay itself comes from H G Short. In a letter to Owen Hunt on 19th February 1964 he commented that in 1935 he found 'a good colony in the field on the landward side of the road halfway along Widemouth Sands. In 1936 for 2 or 3 days (13th and 14th July) the weather was good and I was able to confirm males out and in excellent condition'. He did not record them from Widemouth during his 1937 visit. Much of the former road fell into the sea, being replaced about 1920 by the existing road some 100 metres to landward, so Short was presumably referring to the new road. Most of the fields around here are fairly level and exposed, but the field on the landward side of the road at SS 200025, by the small stream, may have had a more sheltered microclimate with a south facing aspect.

(3) Lower Longbeak (SS 1903): During his 1935 visit, H G Short found them 'not uncommon on the bit of cliff N. of Widemouth Sands'. He confirmed males in excellent condition here in 1936, but did not record them in 1937. Malcolm Spooner found nothing at Smaller (sic) to Higher Longbeak in 1957. Hunt searched Longbeak three times in 1963, without success, but all outside the main flight times.

Bude: 'Bude', or 'near Bude', is found on many specimen labels, but the Large Blue is unlikely to have occurred here. There are no warm south facing slopes in the immediate vicinity of the town, so it is unlikely to have had the concentrations of *Myrmica sabuleti* and thyme to support the butterfly. With the coming of the railway to Bude in 1898, many of the early collectors would have stayed in hotels in the town. From here, they could have walked the few miles to Large Blue sites along virtually uninhabited clifflands. The use of 'Bude' or 'near Bude' would have been an obvious label description for those who did not know, or did not want to record, the name of the exact location. Jackson visited no sites at Bude in 1948. Hunt stayed near here from 15th to 29th June 1963. He found thyme in the private lawns and sheep-grazed Maer Downs and on the golf course, but he considered them unsuitable due to lack of cover and scarcity of *Myrmica* ants. He had unconfirmed reports of Large Blues from Summerleaze Down by juvenile collectors, which must have been mis-identifications. A local informant familiar with the butterfly from sites near Bude told Hunt that he had never observed it or heard of it thereabouts.

NORTH OF BUDE: It is puzzling that no records for these Cornish sites have been located prior to the 1930s. Just to the north, in Devon, Welcombe was known from Victorian times, as were the colonies at Hartland and near Clovelly. These sites were also steep sided valleys, just like those south of Bude. With so many visiting entomologists staying at Bude from the earliest days, it seems inconceivable that none of them had the curiosity to walk north from there to explore the similar topography. Probably, the secrecy surrounding this butterfly meant that those who found the Large Blue north of Bude just kept it to themselves.

Northcott Mouth (SS 2008): Robert Philpott collected here in the late 1940s. Jackson did not visit in 1948. Hunt made three visits in 1963 without success, but only one in the main flight time. In 1964 he recorded a single butterfly, so they were clearly overlooked in 1963. The location must have been the slope of Bucket Hill.

Rifle Range Cliffs (SS 2009): The three fruitless visits by Hunt in 1963 are the only records located (Jackson did not visit here in 1948). He probably received details of earlier records from his local informants, perhaps in the area around Westpark Pit or Sarshall's Pit.

Scadghill Valley (SS 2109): A solitary unsuccessful visit to this inland end of Northcott Valley by Hunt in 1963 is the only record located (Jackson did not visit in 1948). Presumably, this was another site given to Hunt by his local informants. He found only scanty

thyme here in 1963, but in earlier years it may have been better. Provided the habitat was suitable, wind blown butterflies from Northcott Mouth could readily have colonised this area.

Sandymouth (SS 2010): H G Short found the Large Blue numerous here in 1935, and also recorded it the following year on 13th and 14th July. In 1946 it was common. Jackson found nothing here in 1948 (commenting the valley was much frequented by trippers). Robert Philpott collected here in the late 1940s. H G Short found nothing when he revisited the site in 1955 and found the habitat had changed for the worse. The most likely location was the valley immediately to the north of the main access valley at Sandymouth. Hunt paid two unsuccessful visits in 1963, but neither was in the main flight time.

Warren Gutter (SS 2011): No records have been traced for this valley, neither is there any evidence that it was ever visited during any of the surveys. It is not mentioned by Jackson in 1948 or by Hunt in any of his surveys between 1963 and 1968. This is the only valley north of Bude which does not even have a record of being visited. The name of this area, recorded as far back as 1694 and probably even older, confirms a long association with rabbits, with its close cropped turf on the warm south facing slope. *Prima facie*, like every other valley north of Bude, it seems to have had all the necessary features of a typical Large Blue site, and some comment during the surveys would have been expected, if only to record any reasons for unsuitability. This omission is very surprising, as would be a suggestion that, north of Bude, this valley alone never held Large Blues.

Duckpool, Coombe Valley (SS 2011): This was one of Canon T G Edwards' 1946 'six unfrequented valleys', which he revisited with Stanley Wakely in 1950. Jackson found nothing here in 1948, but reported the valley running north from the road was most suitable, with ants and thyme. Robert Philpott collected here in the late 1940s. H G Short also recorded the butterfly here on 14th July 1956. On 30th June 1960 John Fawcett collected a male Large Blue at SS 203⁹117¹, right at the mouth of the valley Jackson thought most suitable. He was staying at Cleave Camp, just a short walk from Duckpool. Despite several visits there over the next 10 days or so, he never saw another. This 1960 record gives credence to a possible sighting in 1962, when Mr Heath, the NT representative, saw a few at his bungalow just a 100 metres from the valley mouth. They were flying past on a grassy patch and pairing. Hunt had four unsuccessful visits in 1963, only one in the main flight time. He made a further two unsuccessful visits in 1968.

Lower Sharpnose Point (SS 1912): Jackson did not visit here in 1948. Hunt made four visits to this site in 1963 and found two butterflies on 7th July. In 1964 he also found a single butterfly. Three visits in 1968 drew blanks.

Stanbury Mouth (SS 2013): Jackson considered this site unsuitable in 1948. Three butterflies were recorded by Hunt on 7th July, and two on 28th July 1963. Tom Jenkyn recorded a male and a female on 27th July 1963. In 1964, Hunt found a single butterfly. They were also present in 1965. Two visits in 1968 both drew a blank.

Tidna Valley (SS 1914): The last confirmed Cornish Large Blue was seen here. The earliest record located was from Canon Edwards, this being one of his 'six unfrequented valleys' reported in 1946. The Church and Vicarage at Morwenstow, and its associations with the idiosyncratic Reverend Robert Stephen Hawker, would have been a considerable draw to the Canon. He re-visited with Stanley Wakely in 1950. Captain Jackson did not record visiting the Morwenstow area in his 1948 survey, a totally inexplicable omission. He would have found easy vehicular access from the road to Morwenstow Church, and there are public footpaths to take you into either Tidna or Morwenstow valley. Robert Philpott collected here in the late 1940s. This was the largest colony found by Hunt in 1963, although he only recorded a total of 27 butterflies on five of his seven visits. The first sighting was on 28th June (his first Large

Blue that year), the last on 27th July 1963. The smaller valley running south from the Tidna stream footbridge supported the main colony, accounting for 70% of the butterflies seen in 1963.

Detailed research was carried out at Tidna in 1964. This involved a novel technique of giving each butterfly a unique mark with a tiny spot of cellulose paint, enabling its identity to be confirmed on recapture. An estimate could then be made of the total population and of the average life of a butterfly. A useful by-product of the marking was a deterrent to collectors, who would not like such a readily identifiable specimen in their cabinets. Using this capture-recapture technique, Alan Kennard marked a total of 119 separate individuals, of which 44 were recovered at least once and some more than once, with one being recaptured five times. This indicated a total population throughout the whole of the flying season of not more than 200, with a maximum daily population not exceeding 70. The average life was only 3 to 4 days, and the longest recorded life was 9 days, but many must have been very short-lived.

The experiment continued in 1967, when Tim Peet marked 53 Large Blues between 27th June and 20th July, a period of prolonged hot weather. This was a considerable reduction on the 180 recorded in 1965. The main population was still in the side valley, with over two thirds being captured here. There was very little movement between the two populations, just one marked butterfly was observed crossing into the other territory. The flying area in the side valley was markedly confined to the stream draining the valley, never crossing over to the gorse slopes on the seaward side. In the main valley, the insect was flying in an area from where the cliff track meets the stream, as far as the sea, with no insects seen on the bracken covered north facing slope.

Tim Peet reported that a few collectors had found the valley in 1967; two from Southend who had heard about it via P W Cribb, Messrs Jarman and Pickett, and Ratcliffe from Birmingham - the latter despite an attempt from Mr G Marsh to put him off. All were closely observed or followed, and no specimens were seen to be taken.

1968 was a terrible year, with savagely bad weather, thunderstorms, heavy rain and flooding. Numbers were greatly down, with an estimate of around 26 specimens only, both in the main and the side valley. Tom Jenkyn recorded the butterfly at Tidna in most years from 1963 to 1972, with significant counts of around 25 butterflies on 3rd and 4th July 1965, about 20 on 20th June 1967 and 8 or 9 on 28th June 1970. In 1970, the committee estimated that the Tidna population was about 20 only. In 1971, a year of much greater sunshine, 47 sightings were made between 23rd June and 12th July. Tom Jenkyn's last sighting was of 6 Large Blues on 15th July 1972.

The two sightings made in June 1973 by Pat Nevin, the NCC warden, are generally regarded as the last Cornish Large Blues. In 1974 Robert Philpott reported a sighting here. On 12th June 1975, a glorious hot day, Tony Archer-Lock was standing half way down the slope when a blue butterfly came down towards him, hesitated and fluttered around his feet, at which point he noted the black crescent pip-marks and how small it was. It continued down the slope towards the rushy stream at the bottom. This was probably the very last Cornish Large Blue.

Morwenstow Cliffs (SS 1915): Jackson did not visit this site in 1948. On the last of his four visits here, on 25th July 1963, Hunt found 2 butterflies on the cliffs above Morwenstow valley. He found none in 1964.

Morwenstow (Vicarage) Valley (SS 2015): Another of Canon T G Edwards' 1946 'six unfrequented valleys'. Jackson inexplicably did not visit this valley in 1948. Canon Edwards returned with Stanley Wakely in 1950. Hunt recorded a single butterfly here on 21st July 1963, in a total of eight visits. There was a possible sighting in 1965, and it was present here in 1966.

Yeol Mouth (SS 2016): This was Captain Jackson's only Cornish

site producing Large Blues in 1948, with 2 on a dull day, and 3 on a sunny but windy day. During the glorious summer of 1959, Clive Simson saw 5 males and 2 females at this spot on 8th July, having failed to see any the previous year. Alan Kennard caught a specimen here on 1st July 1962. In four out of his eight visits, Hunt found a total of 18 butterflies between 4th and 31st July 1963, a colony second only to Tidna. Tom Jenkyn recorded 7 butterflies on 31st July 1963. Significantly, Hunt reported a thriving rabbit colony here. Only 6 butterflies were seen in the 1964 survey. The site was accidentally burnt in late summer 1964, but there was a possible sighting in the 1965 season.

In discussion with Owen Hunt and members of the Large Blue Committee in 1965, the landowner, Mr White, let it be known that he wished to plough the 4 acre Large Blue site, and had received a Ministry of Agriculture grant for this purpose. For an annual compensation payment of £10 an acre, he would be prepared to enter into a three year agreement not to proceed, which was accepted in principle by the committee. The SPNR advanced £30 and the Cornwall Naturalists' Trust the other £10, in order to secure the first year. This was probably the first ever payment sanctioned in the name of nature conservation to prevent a destructive agricultural operation. In late Spring 1966, Christopher Cadbury, who had recently acquired land at Marsland for the SPNR, approached the landowner with a view to purchase the Large Blue site. Events took the familiar pattern, with no action whilst negotiations were proceeding, followed by the failure to conclude a sale. It appears that the compensation continued after negotiations had broken down, but the colony was undoubtedly extinct by this time.

Cornakey Cliff (SS 2016): Captain Jackson visited in 1948 and found it had plenty of thyme and ants, but felt it was probably too exposed. Gerry Tremewan saw the odd butterfly here on the top of the cliffs on 19th July 1953 and 10th July 1955. There are no other records.

Litter Mouth (SS 2016): On those same two days, Gerry Tremewan saw most of the Large Blues on the steep south facing valley side of Litter Mouth. Jackson did not mention visiting this site in his 1948 report, but perhaps intended his comments on Cornakey Cliff to cover this area. H G Short saw the Large Blue on 12th and 13th July 1957. Hunt recorded a total of 8 butterflies between 4th and 18th July 1963 on three of his seven visits. Two butterflies were seen in 1964, and a possible singleton in 1965. There was another probable sighting on 8th July 1968. These are the last records from here.

Marsland Valley (SS 2117): The small stream at the valley bottom constitutes the county boundary, so the south facing slope is actually in Devon, but the butterfly probably roamed into Cornwall from time to time. The first record was made to Frank Labouchere around 1933. His 1935 report confirmed 2 butterflies were here on 28th July 1935. This was another of Canon Edwards' 'six unfrequented valleys' from 1946. Jackson considered Marsland Mouth was no good in 1948, with no ants or thyme. Marsland Cliff and Valley south were very suitable, although he saw no insects. Maitland Emmet caught his single Atlantic coast specimen at Marsland on 11th July 1957, and H G Short recorded them on the two following days. Hunt was the last to see the Large Blue here with a single butterfly on 11th July 1963, in a total of six visits.

OTHER CORNISH SITES

Various records exist for sites outside North Cornwall. Some of the more recent records are obvious mis-identifications. Regarding the older records, with the passage of so much time they can never be proved to any degree of satisfaction, one way or the other. In the absence of such certainty, the balance of probabilities should not be tipped automatically against them. The Large Blue was undoubtedly much more widespread in Cornwall during earlier centuries, but many colonies would have become extinct before visiting naturalists

arrived (and most of the Large Blue collectors would have gravitated to the known sites in the north). A few favoured sites outside of North Cornwall could have hung on into the twentieth century.

Many of these records only came to light when the butterfly was almost extinct in its prime haunts. Even on the north coast, whilst the butterfly was widely distributed, its colonies were always localised to a small area of a few acres in a single field or hillside. Searches giving negative results in locations where it may already have been absent for 50 years really tell us very little, even if we assume the right few acres had been visited.

These sites are listed in alphabetical order, together with their 1km OS reference. If the description is imprecise, a tentative 1km reference is given for the most likely site nearest to the general area. Where no 1km reference is shown, the report is either (1) a mistaken location, (2) a clear mis-identification, or (3) simply too vague on the available evidence to be accepted. Further information may come to light for some of these vague sites.

Cape Cornwall, Near (SW 3531 & SW 3532 or SW 3633): On 6th February 1974, Alan Kennard wrote to Peter Gay of NCC referring to a first hand report from this area by H T King of Tiverton. Mr King had recently retired to Devon and reported seeing Large Blues at Carn Glouce (SW 3531) and near Bottallack (SW 3532 or SW 3633) between 1968 to 1970, three were seen at each station in 1968, but only 1 each in 1970. Malcolm Spooner was reported to be a little sceptical, feeling they may be mis-identified Silver-studded Blues, which can be quite large. Although Harry King was a keen moth man, he had experience of identifying some of the less common butterflies, knowing about the Heath Fritillary colonies which used to be at Oakford in Devon. Friends who knew him felt it unlikely that he would have confused Silver-studded Blues and Large Blues. Nothing more is recorded, and presumably subsequent searching drew a blank. In the absence of any confirmation, Harry King's report was treated as a possible sighting only.

In Spooner's manuscript, written nine years earlier in 1965, he noted '*Arion is also reported from near Land's End, more recently*' (ie. post 1947), which could have been referring to this area. He deleted this comment subsequently, and presumably dismissed the reports at that time. Malcolm Spooner was a very thorough man, who had no doubt been on many wild goose chases in trying to pin down Large Blue reports. In 1973 he had visited nearby Minack Head (qv) to check out Ian Heslop's location and formed his own conclusion on its validity. It would be interesting to know the basis of those earlier Land's End reports, which were probably not referring to Heslop's location. Although Heslop had known about Minack from a cousin since 1931, he had not visited it until 1968, three years after Spooner's manuscript. Perhaps there was more substance to those earlier reports, which was being masked by the excessive secrecy surrounding this butterfly.

Housel Bay Hotel: This location is listed in ERICA, quoting Goss (1902), as well as in Spalding (1992). Clark (1906) did not give this as a location, although other Goss records were included. Inspection of Goss' 1902 article shows that his address was given as the Housel Bay Hotel, but he made no suggestion that the butterfly occurred there. His article gave no specific locations for the Large Blue, but listed the following uncommon species as found in the same district; Wood White, Marbled White, Dark Green Fritillary, Shore wainscot moth and Sand Dart moth. Clark lists the Wood White as occurring at Millook, Dark Green Fritillary as common between Henna Cliff (Morwenstow) and Tintagel, and Shore Wainscot and Sand Dart as both being common at Bude. Rollason (1911) lists the Marbled White as occurring near Bude. This confirms that Goss was only referring to sites on the north coast. This is a mistaken location.

Launceston, Near (SX 2985?): Baron De Worms, writing in December 1974, stated '*I R P Heslop also saw Arion near Launceston*'. In his 1964 paper, referring to the Large Blue in

Devon and Cornwall, Heslop states that he has known this species '... in the heart of both counties'. This was undoubtedly his heart of Cornwall record (he also recorded it at Meldon near Okehampton in Devon). It is not known when Heslop recorded the Large Blue here, but his 1964 article refers to 'a long acquaintance' with it in Cornwall, which started in 1931. Around Launceston, the Kensey Valley running west has steep south facing valley sides, with easy public access around Newmills (SX 2985), which may have been his location. Inland Cornish records for the Large Blue do not seem too likely now. Thyme is a calcicole requiring bare soil, and whilst it may be found in small numbers throughout Cornwall, it is rarely abundant away from the coast. This may not have been the case in the 1930s.

Minack Head, St Levan (SW 3821): Mrs Richards, a cousin of Ian Heslop, first identified this site in 1931. Baron De Worms, writing in November 1974, stated that '*...in 1968 and I think again in 1969 the late Ian Heslop saw and took several Arion (Large Blue) in Chapel Valley at St Levans (sic)*'. In a further letter, De Worms recorded '*The original discovery by a lady who lived on the spot was never published in 1927 or since, as it was only as late as 1968 that Ian Heslop was able to confirm its presence at St Levan*'. Specimen 4302 in Heslop's collection in the Bristol City Museum was caught at Minack Head on 11th August 1968, and is undoubtedly the confirmation to which De Worms was referring. In 1976, Heslop's relatives extracted the following data from his diaries '*1968, 11 August, Sunday, Minack Head, M. Orion (sic) L., I No 4302. The Large Blue (two or three others were seen/in cop) was in the area indicated to me by a cousin in 1931*'. De Worms' 1927 may be a simple error for Heslop's 1931. De Worms had not visited the site until June 1974, when he found it was very overgrown. Frank Smith visited Chapel Valley in July 1975. In a 3 hour search he found nothing, but was struck by the dearth of thyme. His daily temperature records at Perrancombe, 30 miles north east of Minack, show Sunday 11th August 1968 as having a daytime maximum of 79°F (26.1°C) and a night-time minimum of 46°F (7.8°C). This wide range of temperatures is indicative of a ridge of high pressure over Cornwall, with its accompanying clear skies and light winds - ideal butterfly weather. Malcolm Spooner had already visited the Porthcurno area in good weather during 1973 and saw nothing. He referred to this as Heslop's location and stated it appeared to have been relatively recently scrubbed over, but it is not clear whether he visited Porthcurno Valley or Chapel Valley. Doubts have been expressed on this record, but it has been supported by every test that can be applied retrospectively, and must now be regarded as proven.

[**Update:** 1) On 17th April 2002, Matthew Oates emailed that he had been to Bristol Museum and inspected Heslop's diaries as well as the specimen. He reports - "The exact wording from his account of his LB trip to Minack Head on 11:8:68 is '*and the Large Blue (two or three others were seen, in rags) was in the area indicated to me by cousin Daere in 1931*'. I have seen the specimen, which is very worn but unturned, and poorly marked. I don't think he went there in 1969, as his diary for that year is very thorough, but I may have missed it. I'm sure he didn't see any in 1969. Like you, I am strongly inclined to accept his record." 2) On 28th June 2011 Dr. Simon Wearne asked for a copy of this report, as "my father claimed he saw a Large Blue near Porthcurno, here in West Penwith, in the late 1960's". On 6th July Dr Wearne confirmed that his father knew his butterflies well and gave the location as "at the seaward end of Porthcurno valley, between the car park and the South-Western facing cliff, in 1968".]

Newlyn, Near: Spooner mentioned a 1947 record by D E Bowden from Newlyn of a single specimen near Newlyn, which he thought might have been on Newlyn Common. His manuscript note went on to say '?? Confirmation has been obtained (*teste JHH*)', but this statement had subsequently been crossed out. Presumably, he concluded it was unsubstantiated or wrong. No information has been traced on D E Bowden.

Par, Near: Shortly after the Large Blue was officially declared extinct in the UK, a report appeared in the Western Morning News of 13th September 1979 of a few seen fluttering down the railway line towards Par station. The observer saw no visible signs of any

markings on them, and reported just catching a quick glimpse of them. Russell Gomm, deputy south west regional officer for the Nature Conservancy Council, advised that he had received three such reports. He thought it was unlikely that these were Large Blues, as the sighting was late, and he stressed that they were not plain blue, but had black markings on the wings. These sightings were unquestionably of Common Blues.

Portreath (SW 6645?): A record exists on the national database for a Large Blue found here by A Morton on 17th July 1902. The record was passed to Monk's Wood by V E Shaw, and was based on a specimen in A Morton's private collection, presumably with this location on the label. Clark (1906) was unaware of this record, nor does it appear in Malcolm Spooner's manuscript. Nothing more is known of this collection, and efforts to trace it have drawn a blank. The steep south west facing slope just east of Portreath Harbour (SW 6645) may have been Morton's location. (*NOTE: The farm at the head of Epphaven Cove (qv) is called Portreath, and was shown as such on the 1888 OS six inch map. It is possible the label was misread and Morton was referring to this known colony.*)

St Agnes Area: In 1965, Malcolm Spooner asked Frank Smith to check out the validity of a 1964 record from St Agnes Head, made by an acquaintance of H G Hurrell. In this coastal district, only Chapel Porth and particularly Trevellas Cove were suitable, but not wholly ideal. Spooner visited the area on 5th July 1965, and came to the same conclusion. He felt this was most likely a mis-identification for Silver-studded Blues, of which he found a small colony below the headland itself, and by the mine half way to Chapel Porth, as well as at Trevellas cove. Hurrell was involved with Hunt's surveys at this time, and would have been making many enquiries about Large Blues. This was probably one of a number of reported sightings he thought worth following up.

St Austell (SX 0153?): The national database gives a 1906 field record for 'St Austell' by Birmingham University Zoology Department. Malcolm Spooner does not seem to have known of this record, but his manuscript states '*In November (1906) Mr G T Fountain showed a nice series of Lycaena arion from 'Cornwall' to the Birmingham Ent. Soc., apparently collected this year*'. The specimens forming the basis for the national database record were tracked down to Birmingham City Museum. In the Stewart Wace Carlier Collection are four Large Blues, collected by G T Fountain, and all are labelled 'St Austell' and for the following dates 3rd, 5th, 17th and 27th July 1906. With four specimens labelled over a four week period, the possibility of accidental mislabelling is most unlikely. Nothing more is known of Fountain, or of his visit to Cornwall. If the record was actually around St Austell itself, the steep west facing slope of St Austell River valley (SX 0153), just to the north of the old town, may have been Fountain's location.

St Columb, Near: Reported as a location in Spalding (1992), on the strength of Tutt (1914). Tutt died in 1911, his book being published posthumously. This states '*CORNWALL;..., east Cornwall, that part east of the high road from Truro, through St. Columb to the inland extremity of Padstow Creek (Rollason)*'. The use of East Cornwall can only have been a reference to the Watsonian Vice County VC2, of which the high road from Truro to Wadebridge, through St Columb, is the boundary. Padstow Creek is the Camel Estuary, so Rollason was probably just telling Tutt the Large Blue occurred in VC2. Rollason might have said '*The Large Blue occurs in east Cornwall, VC2, which is that part of Cornwall east of the high road from Truro, through St Columb to Wadebridge, which is at the inland extremity of Padstow Creek* also known as the Camel Estuary', which could have been edited down to leave just the words in italics. Either Tutt, or the subsequent editor, took this to be some new Large Blue location.

Rollason's address to the Royal Institution of Cornwall's annual meeting in December 1910 was on Cornwall's butterflies, and he refers to his experience of the Large Blue as being in the same locality as Bignell, ie. around Millook. His collection in the RIC

also has specimens from St Gennys (Castle Valley, Crackington). This address was given just a matter of months before his untimely death, and it seems that Rollason knew of no other sites. This is a mistaken location.

St Mawgan Valley (SW 8567? & SW 8666): There are two reports from this previously unrecorded area. When he was almost 12, Professor John Wacher caught a specimen on the coast near Newquay in early August 1939, and saw 2 or 3 others. The specimen was unfortunately destroyed in the blitz on Canterbury in 1942, but he recalls it was a female with the crescent of spots on the upper wing. He does not remember exactly where it was caught, only that he was staying with his godfather in St Austell and they caught a bus to Newquay, but alighted before reaching the town centre and took a second bus. After a short 10 minute drive out of town, they walked for a further half hour. After eating their picnic lunch, they turned inland and not far on he caught his butterfly. His description of the trip indicates the second bus went north, as a journey from St Austell to the south of Newquay would surely have meant changing in the town centre. A 10 minute journey through Porth brings you to Watergate Bay, and a half hour walk north from there would reach Mawgan Porth. The steep south facing valley side just inland from Mawgan Porth, possibly around the mouth of the little combe running north by Merlin Farm, where there would be some shelter from the coastal winds, would fit his description. His field notes, which were kept with him at school and not destroyed in the blitz, still survive. They record *'Although late in the season and probably the cause of there being not many imagines about, this butterfly I found on the head of Wild Thyme. It was in good condition and had not evidently been on the wing long'*.

The second report from the same general area is from Roger Penhallurick, who used to holiday here as a boy. Some time around 1955, he was fairly certain that a butterfly he saw, also in early August, was a Large Blue. It was flying over rough pasture near St Mawgan village, on the south facing slope of the Vale of Lanherne at OS ref SW 869663. Although Roger Penhallurick regards his sighting of little value now, taken with John Wacher's report, it seems that the Mawgan valley did hold the Large Blue.

St Newlyn East: An ERICA record dated 23rd July 1984. Subsequent investigation by Frank Smith showed this to be an erroneous mis-identification by Mrs Robson of Cubert, who confirmed she had only seen a blue butterfly which struck her as 'large'.

Stratton, Near: Malcolm Spooner's manuscript gives the following *'[There are reports of an inland site near Stratton, in a wooded area]*'. In the Cotswolds, Large Blues have been recorded from woodland rides. In Cornwall, thyme is rarely recorded in wooded areas, so this seems unlikely as a breeding site. Spooner placed his note within square brackets, so presumably he had his doubts. The valley of Tiscott Woods is just north of Stratton, and it is quite likely that occasional wind-blown strays from Northcott Mouth or Scadghill Valley could have been forced over the ridge during a summer gale, to end up here. Sightings of such vagrants could account for those reports.

REINTRODUCTIONS

Following the UK extinction on Dartmoor, a reintroduction was tried there using stock from the island of Öland in Sweden. In summer 1983, Jeremy Thomas and Dave Simcox visited Sweden to obtain some eggs. On their return, they raised 93 caterpillars. These were released near 47 *Myrmica sabuleti* nests, and seven butterflies emerged in 1984, a survival rate similar to that of the British race.

This led to further and increasing emergences in subsequent years, and these were supplemented by another reintroduction in 1986. Successful reintroductions have been tried on other sites within its former range.

Two sites are in preparation on the Atlantic coast, with the appropriate grazing management in place and planting of thyme to replace that lost by scrub encroachment. At 2.30pm on 27th June 2000, Dave Simcox and Adrian Spalding released 10 females and 2 males at one of those sites. Five days later a return visit found 5 eggs in three hours searching. Between 15th and 22nd July, Dave Simcox put down exactly 300 larva for adoption by the ants. Very soon, Cornish bred Large Blues will return to the valleys they left over a quarter of a century ago.

ACKNOWLEDGEMENTS

A great many people have assisted in the preparation of this paper, either with their own experiences in the field, or help in tracking down old reports. Several people deserve special mention: John Feltwell, who provided copies of many unpublished papers, Alan Kennard, Chairman of the Large Blue Committee, for his clarification on specific points of detail, John Muggleton for particulars of his fully dated Cotswold records and for checking BENHS records, Tim Peet for copies of his field notes and reports, Roger Penhallurick who provided copies of the research correspondence he used for his 1996 book on Cornwall's butterflies, as well as useful information from the Royal Cornwall Museum, Sandra Skipworth of the Wildlife Trusts for the SPNR archive papers, Frank Smith for providing copies of correspondence he received over the years as county lepidoptera recorder, Adrian Spalding, secretary of the Large Blue Committee, for the benefit of his experience and advice, and for searching out the answers to many queries, Jeremy Thomas for providing much unpublished information from his extensive collection, and Stella Turk for providing information from the library of the Cornwall Wildlife Trust. Paul Harding and Henry Arnold at Monk's Wood provided the records on the national database, as well as the original input cards for anomalous records. Help in tracking down old specimens was obtained from Gabriela MacKinnon at Birmingham Museum Service, and from Mark Shaw and Keith Bland at the National Museums of Scotland. I would also like to thank Tony Archer-Lock, the late Valezina Baroness Bolingbroke (F W Frohawk's daughter) who sadly died in February 2000, June Chatfield, Tim Dingle, the late Maitland Emmet who died in March 2001, John Fawcett, Simon Ford, Brian Gardiner, Michael Harvey, Tony Herr, Graham Howarth, the late Tom Jenkyn who also died in 2000, Christopher Luckens, Ken Merrifield, Mathew Oates, Jean Paton, Robert Philpott, Miriam Rothschild, Lee Slaughter, Henry Symons, Gerry Tremewan, Len Ward, John Wacher, Martin Warren and Derek Worton for all the information they provided.

The late Malcolm Spooner's diligence must be acknowledged. His 1965 unpublished manuscript contains a wealth of information, gleaned at a time when the abundance of the Large Blue was within the living memory of the many entomologists he knew. This report would be considerably the poorer without that detail. He was Secretary, and later Chairman of the Large Blue Committee. After his death, he left a bequest to enable the former Large Blue site of the Tidna to be purchased for the nation. Perhaps one day the reintroduced Large Blues may become sufficiently well established to be released at Tidna. That would be a fitting tribute to his 40 year devotion towards the conservation of this fine insect.

Malcolm Lee
July 2001

REFERENCES

Archer-Lock A	1988	Letter to R D Penhallurick; 19 th June 1988
Archer-Lock A	1999	Letter to M Lee 18/3/1999
Bland K	1999	Letter to M Lee 24/08/1999
Bolingbroke, Baroness	2000	Letter to M Lee 18/01/2000

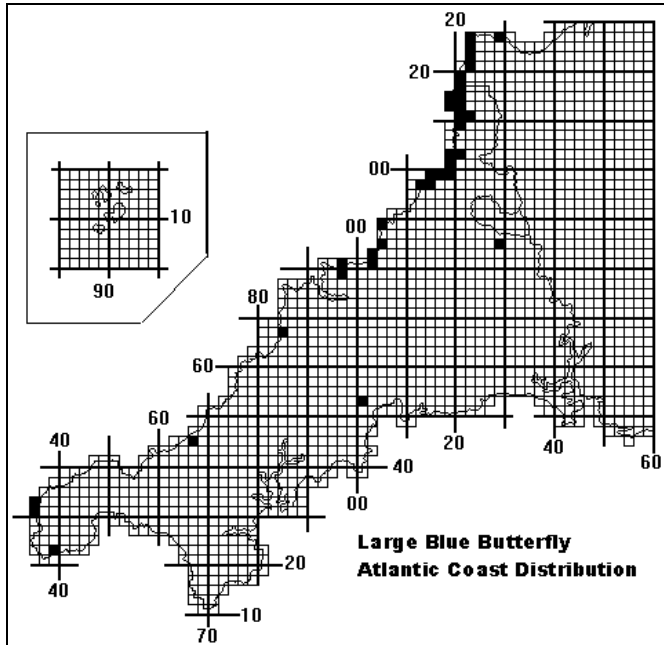
Bright P M	1925	'Overcollecting', Entomologist 58:273-275
Byers F W	1964	'Reminiscences of Cornwall', Ent Rec 76:232-3
Chapman T A	1915a	'What the larva of <i>Lycaena arion</i> does during its last instar' Trans. Ent. Soc. London. Vol. 63 pp291-297

Chapman T A	1915b	'Observations completing an outline of the Life History of <i>Lycaena arion</i> L.' Trans. Ent. Soc. London. Vol. 63 pp298-312	Muggleton J	1999	adults in Gloucestershire 1858-1960', Entomologist's Gazette 25:239-244
Chatfield J E	1987	'F W Frohawk: His life and work', The Crowood Press, Marlborough	Oliver G B	1920	Letter to M Lee 21/07/1999
Clark J	1906	'Lepidoptera' (Butterflies pp203-207) in Page W (Ed), Victoria County History, Cornwall, Vol 1, London	Paton J A	1998	'Scarcity of <i>Lycaena arion</i> , etc., in Cornwall', Entomologist 53:279-280
Demuth R P	1984	'Reminiscences of an elderly Entomologist' Ent Rec 96:268	Peet T	1967	Location: 'Tidna on day of Large Blue Jamboree' - letter to M Lee: 30/12/98
De Worms Collection		Data from specimens in de Worms Collection, National Museum of Scotland	Penhallurick R D	1974	' <i>Maculinea arion</i> L. Marking Experiment 1967' Report to JCCLB
De Worms C G M	1940	The Entomologist 73:86	Penhallurick R D	1996	Letter to Baron de Worms 22/11/1974
De Worms C G M	1950	'British Lepidoptera Collecting, 1949', The Entomologist 83:104	Philpott R	1999	'The Butterflies of Cornwall and the Isles of Scilly', Dyllansow Pengwella, Truro. 180pp
De Worms C G M	1958	'British Lepidoptera Collecting During 1957', The Entomologist 91:149	Priestley H	1979	Letters to M Lee 2/3/1999 & 30/8/1999
De Worms C G M	1974	Letters to R D Penhallurick 27th November and 3rd December 1974	Rawnsley H D	1920	'The what it cost the day before yesterday book' Kenneth Mason, Havant 95pp
Dingle T	1999	Note of a conversation 5th March 1999	Rollason Collection		'A Nation's Heritage', George Allen & Unwin, London. 160pp
Disney A W M	1919	' <i>Lycaena arion</i> in Cornwall', The Entomologist 52:216	Rollason W A	1911	Specimen data from W A Rollason's collection in the Royal Cornwall Museum
Emmet Collection		Data from specimen in personal collection of A M Emmet	Rothschild M		'A Record of the Butterflies of the British Islands in 1910 with especial reference to Cornwall' JRIC Vol XVIII (1911) pp398-408
ERICA Database		ERICA (Environmental Records In Cornwall Automated) database Large Blue records held by Cornwall Wildlife Trust	Marren P	1997	'Rothschild's Reserves Time & Fragile Nature' Balaban Publishers/Harley Books, Colchester 242pp
Fawcett J	1999	Letter to M Lee dated 03/12/1999	SCPBI	1936	Minutes of SCPBI meeting 28/4/1936
Feltwell J	1995	'The Conservation of Butterflies in Britain' 230pp, Wildlife Matters, Battle.	Simson C	1994	'The Butterflies' Fly-past' Peregrine Books, Leeds. 127pp
Ford S	1998	Note of conversation with Simon Ford 16/12/1998	Slaughter Collection		Data from specimens in personal collection of L Slaughter
Frohawk F W	1906	'Completion of the Life-History of <i>Lycaena arion</i> ' Entomologist 39:145-7	Smith F H N	1999	Location & Date from Data Label, per letter to M Lee 11/1/1999
Frohawk F W	1915	'Further observations on the last stage of the larva of <i>Lycaena arion</i> ' Trans. Ent. Soc. London. Vol 63 pp313-316	South R	1884	'On the probable extinction of <i>Lycaena arion</i> in Britain' Ent. Mon. Mag. 21:133-134
Frohawk F W	1924	'Natural History of British Butterflies', 2 Vols, Hutchinson, London (Large Blue pp137-149)	South R	1891	'Entomological Club' (report of meeting 11/12/1891) The Entomologist 25:51
Goss H	1884	'On the probable extinction of <i>Lycaena arion</i> in Britain' Ent. Mon. Mag. 21:107-109	Spalding A	1992	Cornwall's Butterfly & Moth Heritage, Twelveheads Press 48pp
Goss H	1902	' <i>Lycaena arion</i> etc in Cornwall', Ent Mon Mag 38:220	Spalding A	2000	'The Large Blue in Cornwall' The Butterfly Observer, Cornwall Butterfly Conservation Newsletter, 17th Ed, Autumn 2000 pp 22-23
Harvey Collection		Data from specimens in personal collection of M S Harvey	SPNR	1913	Archive papers and Maps referring to proposed Large Blue reserve
Herr A	2000	Note of conversation with Tony Herr 10/02/2000	Spooner G M	1946	'Confidential Report' 6pp Unpublished Manuscript Report to SCPBI of a visit to North Cornwall 23/6/46 & 14/7/46: Undated (July? 1946)
Heslop Collection		Data from specimens in the Heslop Collection, Bristol City Museum	Spooner G M	1963	'On the causes of the Decline of <i>Maculinea arion</i> L. (Lep. Lycaenidae) in Britain' The Entomologist 96:199-210
Heslop I R P	1964	'Cotswold revisited', Ent Mon Mag 100:190-192	Spooner G M	1965a	Unpublished Manuscript Report on Large Blue: Cornwall (p24-34)
Hodgson S B	1947	'Lepidoptera in North Cornwall', The Entomologist 80:196-197	Spooner G M	1965b	Letter to F H N Smith 13th July 1965
Hollowell A	1976	Bristol City Museum letter to R D Penhallurick; 5th March 1976	Symons H	1999	'Rabbit Catching' Note of a discussion on 22nd February 1999
Howarth T G	1999	Letter to M Lee 15/5/1999	Thomas J A	1989	'The Return of the Large Blue Butterfly', British Wildlife Vol 1 No 1 pp2-13
Hunt O D	1963	INTERIM REPORT ON 'LARGE BLUE' ENQUIRY Investigations during 1963 Unpublished report to the Joint Committee of Devon & Cornwall Naturalists' Trust 18pp	Thomas J A	1999	Letter to M Lee 16/11/1999
Hunt O D	1964	'LARGE BLUE' ENQUIRY PROGRESS REPORT TO JOINT COMMITTEE Unpublished report to the Joint Committee of Devon & Cornwall Naturalists' Trust 7pp	Tremewan Collection		Data from specimens in personal collection of W G Tremewan
Hunt O D	1968	Report on survey of 'Large Blue' breeding sites in Devon and Cornwall in 1968 Unpublished report to the Joint Committee of Devon & Cornwall Naturalists' Trust 7pp	Tremewan W G	1999	Litter Mouth additional location per letter to M Lee 7/1/99
Jackson R A	1948	' <i>Maculinea arion</i> . Visit to Cornish and North Devon Coast June 29th-July 10th 1948' Unpublished Report to the SCPBI dated 12th July 1948 5pp	Tutt J W	1914	'A Natural History of British Butterflies' Elliot Stock, London p355
James R E	1901	'Lepidopterological Notes from Cornwall', Ent Rec 13:366-369 JCCLB Committee Meeting Minutes 1963 to 1974	Wace Carlier Collection		Data from specimens in Wace Carlier Collection, Birmingham City Museum
Jenkyn T	1989	Letter to F H N Smith 26th July 1989	Wacher J	2000	Note of a conversation with M Lee 21st December 2000
Kennard A	1964	' <i>Maculinea arion</i> L. Paint Marking Experiment Tidna Valley (Tonacombe) 1964' Manuscript report to JCCLB 5pp	Wakely S	1951	'Collecting in North Devon and Cornwall, 1950', Ent Rec 63:36-38
Kennard A	1974	Letter to Peter Gay, NCC dated 6th February 1974	Ward L	2000	Letter to M Lee dated 06/02/00
Labouchere F A	1935	'Report on visit to Bude'; 26th to 29th July 1935. Unpublished Report to the SCPBI dated 31st July 1935 4pp	Warren M	1994	Butterfly Conservation: December 1994, Draft Species Action Plan, Large Blue Atlantic Coast Distribution Map, Annex 3 Figure 2.
Luckens Collection		Data from specimen in personal collection of C Luckens	Western Morning News	1978	Article: 'Out of the blue-sightings of extinct butterfly', 13/9/1979
Marsden H W	1884	'On the probable extinction of <i>Lycaena arion</i> in Britain' Ent. Mon. Mag. 21:186-189	Whittingham W G	1907	'Notes on collecting during 1906', The Entomologist 40:156-158
Monks Wood Database		Cornish Large Blue records held on the National Database	Worldwide Butt.	1988	Worldwide Butterflies Ltd.: DoFE Licensed 1988 sale of old butterfly collections
Muggleton J	1974	'Dates of appearance of <i>Maculinea arion</i>	Worldwide Butt.	1990	Worldwide Butterflies Ltd.: DoFE Licensed 1990 sale of old butterfly collections
			Worssam C	1924	'A Holiday in North-West Cornwall in 1924', Entomologists Rec 36:142-143
			Worton Collection		Data from specimens in personal collection of D Worton
			Wroe D J	1995	An Illustrated History of the North Cornwall Railway, Irwell Press, Caernarfon. 152pp

The Occurrence of the Large Blue Butterfly *Maculinea arion* in North Devon

by Malcolm Lee

a northward extension of the Atlantic Coast sites listed in the July 2001 report –
The Occurrence of the Large Blue Butterfly *Maculinea arion* L. in Cornwall



Large Blue Butterfly tetrad distribution in Cornwall and North Devon

Welcombe Mouth (SS2118) An early locality from Victorian times. Jeremy Thomas gives the first record here as 1893. Michael Harvey has a specimen in his collection (*ex Peter Cribb*) labelled 'Welcombe – July 1897', but without any collector's name.

Jackson's 1948 survey records - *A well known locality, where the insect was very common last year. This is said to be the scene of a noted dealer's depredations. On the 29th I found one arion at rest, and on the 8th, a better day, I saw several flying. There are a lot of thyme and ants at the grassy bottom of the valley and on the northern slopes. The butterflies I saw were mostly flying abreast the "Hermitage" probably driven inwards for shelter.*

Peter Cribb collected many specimens here on 10th July 1955, 29th June and 1st, 7th and 12th July 1956, and on 2nd July 1959 (*Harvey Collection*). Frank Smith collected specimens here on 5th and 8th July 1958. Clive Simson recorded many flying on 7th July 1959. In his 1963 survey, Owen Hunt saw just one butterfly on 11th July, in a total of 7 visits. Numbers considerably improved in 1964 and 1965, with 31 seen in each of these years. The 1964 figures were mainly from a report by Mr R.A. Jarman from Maidenhead, who visited here on 5th July with a friend and estimated around two dozen on the wing. The rest were seen by Malcolm Spooner. Three were seen in 1966, and the last known specimens were four seen by Mr Jarman on 5th July 1967.

Knap Head Undercliff (SS2118) This area, immediately north of Welcombe, was not mentioned by Jackson. The site was visited many times by Hunt, without success, between 1963 and 1968. As one of the criteria for the places Hunt visited was that they had been former Large Blue sites, perhaps he had received earlier reports from his local informants.

South Hole (SS2119) Jackson's 1948 survey records - *Last year I found what looked like a nice place, but it is now under potatoes!* Hunt never visited here. It may well have been a Large Blue site, but no records are available to substantiate it.

Mansley Cliff (SS2221) Jeremy Thomas gives a 1957 record here, the sole record for this site. Hunt visited this location three times in 1963, without success.

Long Peak (SS2222 & SS2223) Jackson's 1948 survey records - *Long Peak heavily burned but two arion seen flying in bad weather. None were seen in Hunt's 1963 survey, or subsequently.*

Speke's Mill Mouth (SS2223) Jackson's 1948 survey seems to be the earliest for this location, where he records - *Three were also seen at Speke's Mill Mouth – both (including Long Peak) these contain ants and thyme and seem suitable.*

Frank Smith caught a specimen here on 15th June 1960. Alan Kennard visited here in 1961 and 1962, to find just one or two butterflies. Hunt recorded three butterflies here on 8th July 1963 at SS226236, the only sighting in a total of five visits. A report of one seen on 13th June 1964 by R.F. and F.N. Coomber, who claimed no expertise, was thoroughly investigated by Hunt, especially in view of the early date, and accepted without reserve. A further possible sighting was made on 30th June 1968, the last known from this site.

Hartland Quay and St Catherine's Tor (SS2224) A locality known in Victorian times, as Michael Harvey has a specimen in his collection labelled 'Hartland – Partridge June 1899'.

In 1913, this area was proposed by Charles Rothschild as one of the intended reserves of the Society for the Promotion of Nature Reserves. Primarily this was on account of the Large Blue, but also the presence of Peregrines and Ravens. The proposals came to nothing, but in the following decade the Royal Entomological Society's Committee for the Protection of British Lepidoptera attempted to buy this area as a Large Blue reserve. This also fell through, and, in 1930, Dizzard Valley in Cornwall was leased to the CPBL as their reserve.

This was certainly one of Canon Edwards 'six unfrequented valleys' he reported from 1946. The following year, R C Dyson collected a specimen on 18th July 1947 (*Harvey Collection*).

Jackson's 1948 survey records - *Undoubtedly the strongest colony - as many as ten arion on the wing at once. The bottom of the valley is under grain (kind uncertain!) but the butterfly occurs along the hill behind the Tor which has faces W. and S. Unfortunately the locality is well known, is readily accessible (five minutes or so from a car), with paths along each side of the slope. The Western face was heavily burned this spring, another southern slope last year. This does not seem to have hurt the insect. The cliff forms part of the estate (in) of the Lord of the Manor, who lives at Hartland Abbey... It might be possible to erect notice boards at St. Catherine's Tor requesting collectors to limit their catch to six insects per season (three boards required) and to respect the females. One collector patrolled the Tor every day for a month last year, and told his landlord that he had done quite well.*

At the committee meeting following his survey, Captain Jackson undertook to draft a letter to Sir Dennis Stucley to gain his interest and co-operation in protecting the Large Blue on his land. This was obviously successful, as the following year the committee was making suggestions on the wording of signs for the northern and southern approaches to St Catherine's Tor, as well as offering to pay for a watcher during the flight time. The reserve seems to have been successful until the mid 1950s.

Michael Harvey has several specimens collected from Hartland in the 1950s - E. Trindell 8th July 1952, L Coleridge 3rd July 1955, and Peter Cribb on 1st and 7th July 1956. Colonel Rossel's single specimen was collected here with F W Byers on the very early date of 16th June 1960.

In 1963, Hunt recorded 12 butterflies at Hartland Quay between 3rd and 22nd July. At St Catherine's Tor, 4 were seen between 3rd and 8th July, one of which had been marked at the Hartland Quay area, ¼ mile away. Rabbits were noted as present at Hartland Quay in 1963, where they were helping the survival and spread of Thyme. At Tidna and Yeol Mouth in Cornwall, rabbits were also present, and it is significant that these three sites held the strongest Atlantic Coast Large Blue colonies.

In 1964, only 4 were seen at Hartland Quay (the last known records from this site, having been ploughed in the winter of 1963), and a singleton only at St Catherine's Tor. In 1964, R.A. Jarman told Hunt that the early 1950s saw intensive collection in the area around Hartland Quay, which lay outside the St Catherine's Tor reserve. Hunt reported that in July 1961, Peter Cribb found the reserve area 'as brown as a desert'. It appeared there had been large scale burning here in the late 1950s, including within the reserve area itself in 1956.

From 1965, the position at St Catherine's Tor improved considerably, with butterflies seen every year, rising to an annual total of 47 between 30th June and 3rd August 1968. The improvement was not to last, the final records around St Catherine's Tor were made by Tom Jenkyn of five butterflies between 1st to 3rd July 1971, and a singleton on 22nd July 1971. This was the end of the Large Blue in North Devon.

Dyer's Lookout (Blackpool) (SS2225) Jackson's 1948 survey records - *Appears a suitable locality but no butterflies seen in good weather*. Visits between 1963 and 1968 by Hunt failed to record any insect. It may have been an old Large Blue site.

Blegberry (SS2226) Jackson's 1948 survey records - *Appears a suitable locality but no butterflies seen in good weather*. Again, visits between 1963 and 1968 by Hunt failed to record any insect. Perhaps Hunt had information that it was an old Large Blue site.

Damehole (SS2226) The only references to this site are unsuccessful visits to SS225264 by Hunt between 1963 and 1968. Perhaps it was an old Large Blue site.

Upright Cliff (SS2226 & SS2326) The first record for this site is in Jackson's 1948 survey, where he records - *A very suitable locality. One arion seen in bad weather - might be worth colonising*. Owen Hunt recorded the last butterfly here, a singleton at SS229268, on 8th July 1963. This was the only butterfly recorded in 5 visits to the site.

Hartland Point (SS2327) A sole unsuccessful visit to the clifftops at SS231275 by Owen Hunt on 27th July 1963 is the only reference located. Perhaps an old Large Blue site.

Brownsham (Mouth Mill) (SS2926) This appears to have been C. W. Dale's original 'Clovelly' site, where he found the Large Blue in abundance some time around 1880 - the first find on the Atlantic Coast. He published this location in the part work of *The History of our British Butterflies* which came out in 1887. Richard South's 1906 book referred to the butterfly being extinct here by that time, but Ian Parr of Sheffield has a female in his collection labelled 'Clovelly 8th July 1930'. This seems to be the last record from the area. It was not visited by Jackson in 1948, or in any of Owen Hunt's surveys.

Cornborough (SS4128) There was a reported casual introduction here by Mr Jarman in the 1950s. Undoubtedly it was a failure, on what seems an unpromising site.

Malcolm Lee
October 2003

NOTE: This northern extension of my Cornwall Large Blue report was written in order to place on record Large Blue data relating to the north Devon coast. Together with my Cornwall report, it was included as part of the supporting documentation for the grant application of the proposed *Atlantic Coast and Valleys Project* for habitat restoration, sponsored by North Cornwall District Council. Malcolm Lee

A SELECTION OF IMPORTANT HISTORICAL REPORTS

LABOUCHERE F A 1935: "Report on visit to Bude". Unpublished Report to the SCPBI dated 31st July 1935. Typed up by Malcolm Lee from a copy of the original report in the SCPBI minute book.

Report on visit to Bude

On my recent visit to Bude from 26th to 29th July, I was unable, in the short time at my disposal and owing to the fact that I had only one fine day, to carry out more than half of what I had intended. On the Saturday I visited the Dizzard and saw Mr. Heal, who told me he had sold his share of the farm to his sister and had taken another farm twenty miles distant. I walked down the combe and was disappointed with the condition I found it in. Since its lease to Mr. Hedges, no burning has been done, with the result that, with the exception of a very small area (perhaps two acres), the ground is choked with a growth of grass, bracken and gorse from 3 to 5 feet high. On that part nearest the sea, which was the cleanest, I saw very little thyme, and Heal informed me that he had seen fewer arion about this year than last. In former years he said it was his practice to burn a portion of the combe every spring, and in my opinion this should be done next spring otherwise in a short time the place will become quite unsuitable as a breeding place for arion, for the available area is now very restricted. As regards the watcher, he describes him as a thoroughly conscientious and reliable man who lives at a nearby farm in sight of the Dizzard. After seeing Heal, I found the locality referred to in Mr. Leader's letter to Mr. Edelsten of 4th March. Unfortunately, Mr. Leader was away, so I did not have the advantage of meeting him. Sea fog and mist prevented the insect being on the wing, and it was only on Monday (29th - ML), on visiting the place again, that I saw two.

I think the season has been a normal one in Cornwall and was practically over at the time of my visit. The place had evidently got known and had been thoroughly worked. It was trampled down in all directions, cigarette ends and match ends were scattered about, but the worst feature was that those ant-hills which were visible had been systematically opened up for pupae - the tops had been cut off and were lying alongside. In ant-hills I saw elsewhere, four out of five in the open had been more or less disturbed, but I am inclined to put the excavating down to the action of rabbits, being in no way comparable to what I have described above. In view of a report that was passed on to me that the ant-hills had been razed, I endeavoured to ascertain from the owner of one of the cottages at the foot of Millhook (sic) hill what collectors had been down there. She said there had been a good many this year, and some of them had been very

satisfied with their catches. The following are some of the names:- Messrs. Snell, Sutton, Sills, August, Colonel Wood, Bartlett, Rosborough and Greenwood. Of these, Sutton and Greenwood had been in the neighbourhood for three or four weeks, and had collected assiduously. The latter lives at Bristol and makes no secret of his taking large numbers of any given insect, if it has a market value. I understand from Mr. I. Heslop, who also lives at Bristol and knows him, that some years ago he took as many as 600 Palaemon. He is reported to have had an assistant with him at Millhook. Collectors this year appear to have got their specimens from the proximity of the Dizzard, from a locality one and a half miles up the Millhook valley and from the locality described by Mr. Leader.

On Sunday the 28th the weather began to clear about mid-day and I then went off to Marland (sic) mouth. The ground appeared ideal, plenty of thyme and ant-hills. It was not till quite late in the afternoon, however, that the sun came out and in the course of an hour I saw two arion, sufficient to prove that it is there. I had not the time to explore Hobby Drive (east of Clovelly - ML) nor the combes between Marsland and Bude.

To revert to the question of destruction of ant-hills, in my opinion it appears unlikely that the individual, Mr. X, whose name was associated with the report, would have had a hand in it. He has much to lose by resorting to methods which, if proved, would react to his serious detriment. Moreover, I do not think he has a really large stock and any rise in price would hardly compensate for the amount of ill will which would be engendered. I think one must look elsewhere, either a private collector or some country dealer.

I would suggest that Mr. X be told of the destruction of ant-hills and asked as a member of the Royal Entomological Society to assist in establishing, if possible, the identity of the person responsible. For his own sake he would take some trouble if he were not responsible, and if he were responsible the knowledge that the ill deed had become known would have a deterrent and salutary effect.

(Signed) *F. A. Labouchere*
(Dated) *31st July 1935*

SPOONER G M 1946: "Confidential Report" of a visit to North Cornwall 23/6/46 & 14/7/46. Unpublished report to SCPBI undated (July? 1946). 6pp. The following text was transcribed by Malcolm Lee from a photocopy of the hand-written six page manuscript found in the minute books of the Standing Committee for the Protection of British Insects by John Feltwell. G M (Malcolm) Spooner visited North Cornwall with F (Freddie) S Russell on 23rd June and 14th July 1946. It is not dated, but was presumably written shortly after the visit, probably in late July 1946. It has been transcribed as written, but explanatory notes in brackets have been inserted, where necessary.

Confidential Report

In our two visits (by FSR and GMS, assisted on July 14th by Mr P G Corbin) to Dizzard Head undercliff ("The Valley") on June 23rd and July 14th 1946 no arion were seen at all. On the second occasion various other possible sites between Widemouth and Dizzard were also explored, also without success.

It is difficult to assess the significance of these negative results, and so to reach any positive conclusions about the status of arion in the old Insect Reserve. Some inferences, however, can be drawn from our observations on the condition of the ground in this particular area, and on the nature of N. Cornwall arion habitats in general.

On neither day was the weather ideal, but the special area indicated by Mr Edelston's (*H M Edelsten, founder member of SCPBI/CPBL - ML*) sketch was investigated at the best part of each day. On June 23, elsewhere mainly fine and sunny, the N. Cornwall coast was invaded by patches of sea fog, which cut our day short. However, we had 1½ hours of bright sun when exploring the upper part of the undercliff above Dizzard Head, and would certainly have seen any arion present. On July 14, though almost continuously sunny, there was a strong N. wind which was scouring the slopes directly facing that quarter. But the Dizzard locality was quite sheltered and was visited during the warmest part of the afternoon; other butterflies were here in full activity.

Hitting the most suitable date was more than ever a gamble this year. From mid May onwards the season had been getting later and later. In the South West it has proved a poor year for butterflies in general, and I think particularly for Lycaenids. On July 14th it was even possible without much trouble to take a census of all the butterflies we saw (except Meadow Browns and Ringlets). Our list does not contain a single Lycaenid! It seems likely that June 23 was too early this year for Arion in N. Cornwall, and July 14 certainly not too late (it may even have been too early!). I conclude that this year many fewer arion have emerged than is usual, and that some of these have been abnormally delayed.

The broad stretch of undercliff between Dizzard Point and Long Cliff, apparently locally known as "the Valley", was found to be much overgrown with scrub, bramble, and bracken, and much of it was impenetrable. A broad belt of an unusual type of oak scrub, running along its middle part separates an upper and lower zone of shorter vegetation. It was presumably in the broader upper zone that Mr Edelston [*Edelston has been struck through and Hedges (A V Hedges) has been written above, probably by Edelsten - ML*] found his arion colony, though the pencil square marked on his sketch lies right across the oak scrub belt. The ground looks promising at a distance. There are patches of turf-covered slope, and growths of heather around prominences derived from some past landslip. But inspection shows two bad

disadvantages: (i) severe restriction of the open ground through encroachment of bracken, gorse, bramble, honeysuckle, blackthorn, and other scrub plants, a process which seems to be progressing fairly rapidly, and (ii) absence or extreme scarcity of thyme. There has probably been considerable change here during the last 10 years or so. In several places heather, and even gorse, could be seen being overgrown and smothered with bracken and bushes. One or two narrow tracks which had evidently been used not so long ago were now blocked. In fact it is now difficult to find any way of getting along through this zone. The best bits of remaining open patches are in the "area 1" I have marked on the sketch map. It includes ground most recently disturbed by landslips, and a shallow depression in which there are strips of grassy banks not affected by cattle. Most of the remaining heather also occurs here. But there is almost no thyme here: on July 14 when this plant was in full flower only two small stray patches were found (we had previously on June 23 failed to find any leaves here). Perhaps the general increase in bracken and scrub has increased dampness enough on the restricted open grassy strips which remain to discourage plants like thyme. It looked also as if the margin of the oak scrub was spreading upwards.

The ground westward of 'area 1', in the upper zone referred to, has some grassy slopes, but these are cattle trodden and there is no thyme at all. But a piece of irregularly broken and pitted ground, in a shallow gully opening onto the undercliff from the direction of E. Dizzard (marked "area 3") is still in a suitable condition. This small patch of ground was only discovered on July 14th: there were several good clumps of thyme, and a small colony of Marbled Whites, a species not seen anywhere else that day. This is the only area in the whole of the upper zone where arion at present would have much chance of hanging on.

The lower zone, fringing the sea cliff, was visited on June 23 - "Area 2" in sketch - Though quite open here, much of the ground is grown over with short bracken or stunted wind-swept gorse a few inches high. The grassy clearings which remain would be suitable for arion, as sufficient thyme occurs, but would presumably not support colonies of any size.

Though it is unlikely that arion ever suffers through lack of suitable ants, of which there are always a variety on every type of waste land (*Myrmica scabrinodis* is almost ubiquitous on grassy slopes, whether on acid or alkaline soils, nesting under stones or tufts of grass), the ant fauna of the undercliff was checked up. In "area 1", the following species were noted:-

Myrmica scabrinodis, nests occurred freely under stones.

Lasius flavus, nests also freely in turf and under stones.

Lasius niger, nests under stones on stony ground.

Formica fusca, nests under stones on grass, etc.

In the lower zone:- *Myrmica scabrinodis*, typical, *M. scabrinodis* var *sabuleti*, *M. ruginodis*; *Lasius flavus*, of which several mound nests; *L. niger*; *Formica fusca*; and *Tetramorium caespitum*. There is thus the normal abundance and variety of ants, wherever the ground is not overgrown by dense scrub.

Rhopalocera seen here include:-

Small pearl-bordered: rather numerous in the lower part of "area 1", on June 23, flying strongly, mostly faded, but some quite fresh. (In a normal year I expect only a few very worn examples would have persisted to this date.)

Common Blue: only one worn, on June 23 (and no other Lycaenid)

Marbled White a few in "area 3" on July 14. Speckled Wood, a few along the edge of the oak scrub, June 23. Meadow Brown, rather sparingly, most concentrated in "area 3". Grayling & Ringlet, singly. Small Skipper, 2 in "area 3", July 14. Pierids: 1. This may give some idea of the poverty of the season!

Among potential arion habitats visited on July 14 were:-

- (1) Cliff slopes N.E. of Millook - here we were rather handicapped by the wind, but Graylings, etc were on the wing: a very suitable looking locality.
- (2) Slopes N. side of Millook valley - largely suitable where not overgrown with stunted gorse.
- (3) A grass slope (short turf) inland from Millook, facing south, and with a luxuriant growth of thyme.
- (4) Slopes S. side of Millook - but these too much overgrown with bracken.
- (5) Undercliff between Millook and Canceave Strand.
- (6) Undercliff and gully at Sharnhole Point. We also went to Crackington Haven.

As pointed out already, it is difficult to make any definite recommendations, but a few ideas are tentatively offered.

(i) The former Insect Reserve at Dizzard has clearly deteriorated in the past few years from the spread of scrub, etc., which has overgrown the open turf and carpet vegetation. It appears capable now of providing no better sanctuary for arion than anywhere else along this coast.

(ii) For many miles, the coast and adjacent valley slopes provide an almost continuous belt of country capable of supporting a scattered population of arion, and apparently has done so up to the war years. In an average year I picture a sparsely, but more or less continuously, spread population which here and there (but by no means at all suitable points) swells into a more or less populous colony. These colonies may flourish for a year or two and then wane, while others spring up temporarily at other points. This is only surmise: other entomologists, especially those who have any experience of arion (which I haven't!) may be able to disprove me. But if this picture, which is certainly true of some of the Aculeata, is even partially true in arion, the question arises whether it is much use attempting to protect

any particular patch of ground. Protection, if feasible, should be aimed at the species rather than the locality. Individual species of birds have legal protection: why not butterflies?

(iii) The extensive stretches of ground over which potential habitats are scattered - mostly slopes facing the sea - are not of easy access and, more particularly, are difficult to traverse. It takes time even for a naturalist (!) to cover the ground and routes have to be carefully chosen. It would be impossible for even quite intensive collecting to eliminate an insect which flies over such country. I do not suppose arion has ever been in more danger of serious reduction by over collecting than any other insect here. (moreover the number of people who would now want to take long series of rarities must now, in 1946, be very small). The question of "development" of this coast, approached by a few abominable narrow hilly roads (at Millook there is only parking space for one car!), does not at present arise and probably will not arise for a long time. It is doubtful whether it is worth attempting protection for arion in this district, it has excellent natural sanctuary.

(iv) At present a notice board, now suffering from age, but still just legible, stands at the top of one of the very few used paths leading to the shore in the Dizzard area. (It warns that insect collecting is strictly prohibited.) Though this board is harmless where it is, it ought to be removed if a watcher is not re-engaged. Notices like this placed near colonies of rarities only draw unnecessary attention, and make it easier for such insect bandits as may still exist.

(v) Encroachment of vegetation on turf and open heather association is not confined to the Dizzard 'valley'. Between Sharnhole point and Millook, for instance, much of the cliff slopes is covered with bracken, which may well be on the increase. It would be interesting to know if any general change had taken place, or tendencies to change apparent, since, say, the early 1900s. Information on this point should be available. If there has been appreciable increase of bracken or scrub during this period, we are warned what to expect in the future - a general decline of arion. A botanist's opinion would be worth getting. It seems that, except on the steepest and most stony slopes, only occasional landslips and fires interrupt the steady trend towards a woodland-scrub climax. (A stretch of undercliff east of Dizzard pt. has recently been burned, probably accidentally.)

(vi) If Dizzard 'valley' is no longer worth protecting as in the past, it is worth considering whether anything more effective can be done in aid of arion in N. Cornwall. But first, more precise information should be obtained (and supplemented at regular intervals), on the status of the butterfly and its habitats. As a start it would be necessary for someone, staying on the spot, and working continuously for at least a month at the height of the season, to cover most of the coast between Tintagel and Hartland. This would be the only way of getting a reasonable idea of the butterfly's present status, and until this is done, it is scarcely possible to judge the best type of temporary protection or conservation method to adopt. Even then, it would still be necessary to find out the sort of natural fluctuation which takes (*NOTE: Parts of these last two paragraphs are unreadable on my copy. Sections in italics are my estimate of what was intended. ML*) place from one year to another before making any decisions. For instance if, contrary to these predictions, it is found that the population tends to be centralised in flourishing colonies,

then protecting one or more of these colonies *may be the appropriate procedure*. Or again, if colonies are found to be diminishing *over time*, changes in the vegetation, systematic burning of scrub or bracken might be worth undertaking in places where protection is most feasible, and so on - everything depends on how the population is distributed in space and time.

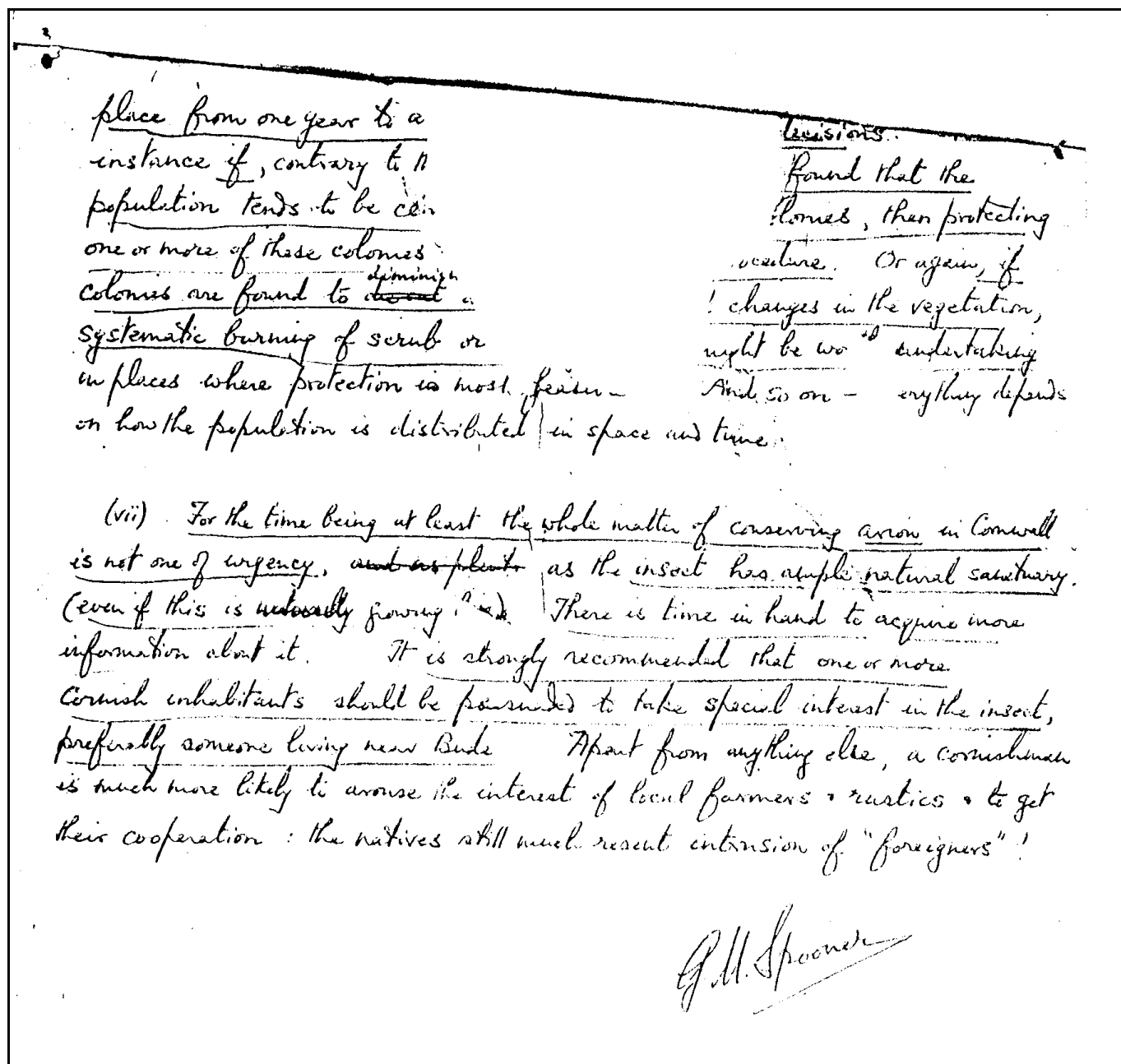
(vii) For the time being at least, the whole matter of conserving arion in Cornwall is not one of urgency, as the insect has ample natural sanctuary (even if this is growing less*). There is time in hand to acquire more information about it. It is strongly recommended that one or more Cornish inhabitants should be persuaded to take special interest in the insect, preferably someone living near Bude. Apart from anything else, a Cornishman is much more likely to arouse the interest of local farmers and rustics and to get their co-

operation: the natives still much resent intrusion of "foreigners"!

(signed) G M Spooner

* **NOTE:** In John Feltwell's 1995 book *The Conservation of Butterflies in Britain*, p75 he quotes this section as "(even if this is naturally growing?)" This is not a logical phrase, when taken with the rest of Spooner's report. On my copy, the word "naturally" looks like it is intended to be crossed out (perhaps his use of the word "natural" in the previous phrase made Spooner delete this repetition). There is a word after "growing", which, although obscured, I think may be "less". This phrase would then make more sense, intending to draw attention to the slow reduction of sanctuary by scrubbing over, but that there was still time in hand to get more information. ML

Last page of Spooner's 1946 manuscript showing missing/obscured sections -



JACKSON R A 1948: "*Maculinea arion*. Visit to Cornish and North Devon Coast. June 29th - July 10th 1948." Unpublished report to SCPBI dated 12th July 1948. 5pp. Typed up by Malcolm Lee from a copy of the original report found in the minute books of the SCPBI by John Feltwell.

Maculinea arion **Visit to Cornish and North Devon Coast** **June 29th - July 10th 1948**

I stayed first at the Hartland Quay Hotel, and worked the coast from Welcome north to Hartland point. I then moved to Boscastle, and worked the coast from there to Welcome, visiting all Mr Sheldon's old localities.

The following notes are arranged in order from south to north on the various coombes running down to the sea.

Boscastle to Cambeak There is nowhere suitable for the insect.

Tremouth Haven (Cam Draught of Sheldon's Map). A nice valley - recently heavily burned. No ants or thyme to be seen.

Slope above Crackington A very bare and exposed cliff, largely overgrown with gorse, and rather trampled by visitors. An unlikely place nowadays.

Castle Point A little thyme and ants at the bottom of the valley near the sea, and also along the bottom path. Hillside very heavily burned, and with no thyme to be seen. No butterflies observed.

Chipman Point (The so-called "Butterfly Valley"!) This formed the old R.E.S. preserve, and at a distance looks ideal. On approach it was found that the pleasant green sides were really the flat tops of a dense growth of gorse, two feet deep, mixed with brambles and blackthorn scrub. No plant life other than the above exists, except at the seaward end of the valley, where there are a little thyme and a few ant hills, absolutely exposed to every gust of wind. Only by keeping close to the cliff edge can one escape from the valley. This is a clear case of extermination by kindness. No burning has been done, with the result that the gorse has killed everything else.

Bynorth Cliff The owner tells me that years ago the butterfly swarmed on his cliff, but does not now occur - a statement I accept very readily. Part of the slope is under potatoes, the rest overgrown with brambles and long grass and weeds. No ants or thyme were to be seen.

I can hardly imagine the insect living on the top of the hang cliff, where there is abundant thyme, but no ants, or on the under cliff, which is open to all the Atlantic gales.

Millook Common (Sheldon's Antimony level). Two very nice warm valleys, but little hope for arion now. Very little thyme, and a great growth of gorse and bracken, much impenetrable.

Millook The old locality very exposed and overgrown. Saw Mr. & Mrs. Bernard of High Penhalt Farm. The butterfly used to occur on their land, in the bottom just E. of the hill down from Penhalt Cliff. The slope is now almost impassable but there are a few ant hills with thyme near the top. One butterfly may have been seen last year.

Wanson Mouth The best of all the old localities as regards

thyme and ants, but no butterflies seen under good conditions. The cliff is very accessible and would not be suitable as a reserve, as it is very close to hotels and lodging houses.

This completes Sheldon's localities, and finishes the survey south of Bude.

I also worked south from Boscastle to Tintagel, but there is no valley suitable for the insect.

Sandy Mouth The first suitable place N. of Bude. The butterfly was present in some numbers in 1946, but has not been seen this year. A few might well exist, but the valley is much frequented by trippers.

Coombe Valley No butterflies seen, but there is a most suitable valley with ants and thyme running north from the road.

Stanbury Mouth is unsuitable.

Yeol Mouth A very nice sheltered valley with plenty of thyme and ants - gorse kept down by cattle. Two arion seen on a dull day and three or four on a sunny but very windy day.

Cornahey Cliff Has plenty of ants and thyme, but it is probably too exposed.

Marsland Mouth Is no good - there are no ants or thyme.

Marsland Cliff and Valley South This looks good and is a noted locality. Some of the valley is very suitable, but I saw no insects. There was a strong wind blowing and I was very tired!

Welcome Mouth A well known locality, where the insect was very common last year. This is said to be the scene of a noted dealer's depredations. On the 29th I found one arion at rest, and on the 8th, a better day, I saw several flying. There are a lot of thyme and ants at the grassy bottom of the valley and on the northern slopes. The butterflies I saw were mostly flying abreast the "Hermitage" probably driven inwards for shelter.

South Hole Last year I found what looked like a nice place, but it is now under potatoes!

Speke's Mill Mouth and Long Peck Long Peck heavily burned but two arion seen flying in bad weather. Three were also seen at Speke's Mill Mouth - both these contain ants and thyme and seem suitable.

St Catherine's Tor Undoubtedly the strongest colony - as many as ten arion on the wing at once. The bottom of the valley is under grain (kind uncertain!) but the butterfly occurs along the hill behind the Tor which has faces W. and S. Unfortunately the locality is well known, is readily accessible (five minutes or so from a car), with paths along each side of

the slope. The Western face was heavily burned this spring, another southern slope last year. This does not seem to have hurt the insect. The cliff forms part of the estate (in) of the Lord of the Manor, who lives at Hartland Abbey.

Dyer's Lookout and Blegberry Both appear suitable localities but no butterflies seen in good weather.

Upright Cliff (below Blagden Farm) A very suitable locality. One arion seen in bad weather - might be worth colonising.

General Remarks

During my stay the weather was uniformly bad. Generally windy and very cloudy, with gleams of sun. On the sunny days a North-westerly gale was blowing. As arion dislikes wind and does not fly much without sun, it is hard to dogmatise on numbers.

I would place the localities in the following order;

St Catherine's Tor, Welcome Mouth, Speke's Mill, Yeol Mouth, although perhaps Marsland and Upright Cliff deserve

places.

Swaling

This is essential both for the farmer and the insect. The lack of burning only results in the dreadful state of "butterfly valley". I do not believe that the burning can be done in strips, nor do I think farmers will alter their age-old habits.

Conclusion

The whole coast is intersected by footpaths, and every cliff is passed over by walkers day after day. It seems difficult to recommend the acquisition of any property as a reserve. It might be possible to erect notice boards at St. Catherine's Tor requesting collectors to limit their catch to six insects per season (three boards required) and to respect the females. One collector patrolled the Tor every day for a month last year, and told his landlord that he had done quite well.

(signed) *R. A. Jackson*

(dated) *12.7.48*

PEET 1967: Unpublished report to the JCCLB. Typed up from a copy of Tim Peet's hand written report *Maculinea arion L. Marking Experiment 1967*, which he kindly lent to Malcolm Lee.

Maculinea arion L.
Marking Experiment 1967
by Tim Peet

Observations

Commenced on the 25th June, and were continued on all suitable days until the 27th July. The first butterflies were noted on the 27th June, and the last on the 20th July.

Weather.

The emergence coincided with prolonged hot weather until the 20th July. There were no heavy (and potentially dangerous) thunderstorms. Much of the vegetation had the appearance of drought towards the end of the season.

Numbers of *arion*

The total number of new specimens marked or captured was 53. The second day's flight, on the 30th June showed the maximum number of fresh specimens, but fresh emergences continued until the 20th July. There were no subsequent 'peak' days, just a steady trickle of new specimens.

Details of numbers and recaptures are on the appended sheets.

It is noteworthy that total numbers are markedly down on previous years cf. 119 in 1964.

Marking

As in previous years, using quick drying cellulose paint in varying sequences on the underside of the hindwings. Two specimens were damaged in marking and/or capture, and were unable to fly.

Abnormal Specimens

One dwarf, a male on 12th July was caught. A cripple, but able to fly was taken on the 30th June. No aberrant specimens were seen.

Distribution

The side valley of the Tidna proved to have more *arion* than the main valley, a ratio of 37 to 16. Marked insects released in either main or side valley were not observed to cross into other territory, except one. As in previous years the emergence started at the upper end of the side valley, and was initially of male specimens.

The flying area in the side valley was markedly confined to the stream draining the valley. The insect was not seen flying over the gorse slopes on the seaward facing side. In the main valley the insect was flying in an area from where the cliff track meets the stream, as far as the sea. The bracken covered north facing slope had no insects at all.

Breeding, Collecting, Photography.

Mr V. Bascombe and Mrs Cunningham continued their work. Three live females and two males were removed by them from the valley.

The only two collectors seen were two visitors from Southend, one named Down. The knew the locality from another collector, who in turn had it from Cribb. These two were not observed to take any specimens.

Jarman and Picket, already known to the committee, visited the site on the 8th and 10th July. They were not observed to take any insects, and were closely followed.

T. R. Jenkyn of the Devon Trust was taking photographs in the valley on 7th July.

Ratcliffe from Birmingham found the valley despite an attempt to put him off by Mr G. Marsh and myself. He assured us he was only interested in filming, and was in action on the 9th July. At no time did he produce a net, and he has subsequently offered a donation to the committee's work.

Other sites

Morwenstow Church Valley, Yeol Mouth, Littermouth and Hartland have all been visited by members of the committee, and the insect has not been seen. However, Jarman noted four specimens at Welcombe on 27th July, and Jenkyn noted one at Hartland on 27th June. The sites were not visited sufficiently often for these records to be conclusive.

The site at Lower Hendra where last year's introduction took place, was visited, but in most unsuitable weather. No *arion* were seen.

Suggestions for further management

The following points would seem important:

further clearance of gorse in the Tidna side valley, to enlarge the flying ground of the butterfly.

some transplanting of specimens to other sites, in sufficient quantities to ensure their survival.

continued wardening of the area next summer to prevent collecting.

These points have all been considered by the committee.

T. D. Peet

Maculinea arion L.

This is an abbreviated copy of the field notes on the mark-release experiment.

S.V. = Side Valley

M.V. = Main Valley

SITE	DATE	TIME	SEX	COMMENT	No.	RECAP.
S.V.	27June	11.10	m		1	
S.V.		11.50	f		2	
S.V.		11.53	m		3	
S.V.		11.55	m		4	
M.V.		12.35	m		5	
S.V.		13.30	m		6	
S.V.		13.40	f	At least 6 insects seen, but missed.	7	
S.V.	30 June	10.30	m		8	
S.V.		10.35	m		9	
S.V.		10.47	? m		10	
S.V.		10.55	m		11	
S.V.		10.57	m			3
S.V.		10.57	m			6
S.V.		11.08	m		12	
S.V.		11.12	m		13	
M.V.		10.05	f		14	
M.V.		10.20	m			1
M.V.		10.25	f			7
M.V.		10.30	f		15	
M.V.		10.30	f	} A marked flight of newly hatched } specimens up to 1 1.00	16	
M.V.		11.50	f		17	
M.V.		13.15	m		18	
S.V.		13.51	f		19	
M.V.	1 July	11.10	m	Previously taken 30.6		8
M.V.		11.15	f		20	
S.V.		10.35	f		21	
M.V.		12.00	m	Previously taken 30.6, 1.7		
M.V.		12.10	m	Retained for egg laying; released 4.7	22	
S.V.		12.15	m		23	
S.V.		12.55	f	Retained for egg laying; released 5.7	24	
S.V.		13.55	f	Retained for egg laying; released 5.7	25	
M.V.		14.35	f	} Retained for egg laying; released 5.7 } Taken also on 27.6, 30.6		7
M.V.		15.30		} Already marked: taken by a visitor, } released. Sex - marking uncertain		?
S.V.	[3 July	13.30	f	Missed]		
		14.00	f	Retained for egg laying	26	
S.V.	6 July	10.40	f	Worn	27	
S.V.		10.50	m	Retained for egg laying. Worn.	28	
M.V.		11.40	f	Retained for egg laying.	29	
S.V.		11.40	f } in m } cop.	Retained for egg laying. Previously marked 2.7	30	23

SITE	DATE	TIME	SEX		No.	RECAP.
S.V.		12.20	f		31	
S.V.		12.25	m		32	
S.V.	6 July	12.30			33	
M.V.		13.00	f		34	
M.V.		13.00			35	
M.V.		14.00	f		36	
M.V.	7 July	10.20	f		37	
		10.25	f	Previously marked 6.7		34
		10.45	m		38	
S.V.	9 July	09.50	f		39	
M.V.		10.10	f	Previously taken 6.7		36
M.V.		10.15	m	Torn male. Died.	40	
M.V.		10.20	f	Noted ovipositing. Previously taken 6.7		31
M.V.		10.30	f	Previously taken 7.7		37
M.V.		10.50	f	Previously taken 6.7, 7.7		34
S.V.		12.30	m		41	
S.V.		14.25	m		42	
S.V.		14.40	m		43	
S.V.	10 July	11.45	f		44	
M.V.		11.55	f	Previously taken 6.7, 9.7		31
M.V.		11.55	f	Previously taken 6.7, 9.7		36
S.V.		12.20	f		45	
M.V.		12.40	f	Previously taken 9.7		39
S.V.		13.05	f		46	
M.V.		13.30	f	} Previously taken 6.7, 7.7 } - some marking error?		?? (34?)
M.V.		14.10	f		47	
S.V.	12 July	10.50	m	Previously taken 9.7		41
S.V.		11.30	f		48	
M.V.		11.40	f		49	
M.V.		11.50	f	Previously taken 6.7, 9.7, 10.7		31
S.V.		12.10	f	Fresh	50	
S.V.		12.10	f	Fresh	51	
S.V.		12.10	m	Dwarf	52	
S.V.	20 July	11.30	m	Worn	53	

T. D. Peet

Published Reports

NOTE: At the time these three articles were written in 1884/5, the Atlantic Coast Large Blue colonies had yet to be discovered, so the colonies in the Cotswolds were thought to be the only ones remaining in Britain - *ML*

Scanned from Ent. Mon. Mag Vol XXI (October 1884) pp107-109

ON THE PROBABLE EXTINCTION OF *LYCAENA ARION* IN BRITAIN.

BY HERBERT GOSS, F.L.S.

During the last five and twenty years, *Lycaena Arion* has been gradually disappearing from its known localities in this country. This species was certainly extinct in Barnwell Wold, Northamptonshire, when I first visited that locality in June, 1865; and I was informed by the late Rev. W. Whall, then resident at Thurning, in that neighbourhood, that it had rarely, if ever, been seen in the Wold since the wet summer of 1860.

I have not seen *L. Arion* in Gloucestershire since June, 1877, nor have I heard of its occurrence in that county since 1878; and now we learn, from Mr. Bignell's note in the last number of this Magazine, of the disappearance of this species from its headquarters on the south coast of Devon. It seems highly probable, therefore, that in the course of a few years, "the large blue" like "the large copper" will be numbered amongst the extinct butterflies of the United Kingdom.

In the last week of June, 1876, I spent a few days in Gloucestershire, and on the 26th of that month I first had the pleasure of seeing *L. Arion* on the wing. The scene of this event was an old disused quarry in the Cotswolds, not many miles from Stroud, and at an elevation of over 700 feet. Although there was a considerable extent of wild land in the locality to which I am referring, on the same geological formation, and with an identical flora, *L. Arion* appeared to be confined to a space of about an acre or less; but within this limited area it was not uncommon, and in the course of an hour I netted upwards of a dozen specimens. On the hill-sides in this locality wild thyme was most abundant; and in addition to *Lotus corniculatus*, *Hippocrepis comosa*, and other common *Leguminosa*, there were occasional patches of the local *Astragalus hypoglottis*, together with the sweet-scented little musk orchis, *Herminium monorchis*.

After spending an hour or so on the hill-sides, and in the old quarries, I entered a beech-wood at no great distance, and having traversed it for more than two miles I arrived in some open sunny glades, where there was an abundance of flowers, especially wild thyme. Here *L. Arion* was far more plentiful than on the open hills or in the quarries, and was, moreover, not confined to such a limited area, specimens being met with over an extent of ground more than a mile in length.

In the open glades of this old beech-wood as many as three or four specimens of *L. Arion* were sometimes to be seen at the same time, flying gently about, or settling on the thyme, and they were accompanied by numbers of *Lycaena Alexis* [= Common Blue], and by a good many *L. Adonis* [= Adonis Blue] and *L. Agestis* [= Brown Argus]. I boxed several female *L. Arion*, in the hopes of getting ova, but did not obtain any. Amongst the other insects noticed in this wood were *Chelonia plantaginis*, *Platypteryx unguicula*, *Upliyra trilinearia*, *Melanippe montanata*, and *Acidalia ornata*.

In the end of June, 1877, I again visited Gloucestershire, and stayed from the 25th to the 29th of the month, in a farm

house about two miles distant from the localities in which *Arion* had occurred in the preceding year. I was delighted to find that the species occurred in both localities more plentifully than in 1876, and was even more widely distributed in the open spaces in the beech-woods extending for a distance of nearly two miles.

On the 29th June, 1877, the day on which I left the district, *L. Arion* was commoner than on any previous occasion, and although many specimens were worn, others, both ♂ and ♀ were just emerging from the chrysalis, so that in this species there appears to be a succession of specimens during June and the early part of July.

In June, 1878, I heard from Mr. Marsden, of Gloucester, that *L. Arion* was very rare that year; and from that time to the present he has been unable to report to me the capture of a single specimen.

Last year, after an interval of six years, I was again staying in the neighbourhood of Stroud, from the 18th to the 26th June, and visited the old localities on every day when the weather was fine and calm; but neither on the hills, in the old quarries, nor in the beech-woods, did I see a single specimen of *L. Arion*. Not only were there no *L. Arion*, but *L. Adonis* and *Agestis* were both conspicuous by their absence; and with the exception of a few *Chortobius Pamphilus* [= Small Heath] and a casual *Lycaena Alexis*, insect-life seemed almost extinct. I could scarcely realize that I was in the same locality as that which I had left in June, 1877, so full of life!

There seems to be no satisfactory explanation for this sudden disappearance of *L. Arion* from these localities in the Cotswolds. It has been suggested by some persons acquainted with the district, that the apparent extinction of the species may be attributed to the practice of burning the grass on the hill-sides for the purpose of improving the pasture. Had the herbage on these hills been burnt for the first time in 1878, it might, with some reason, have been considered the probable cause of the extinction of *L. Arion*, but as the practice of burning the grass is not a new one, but has, as I have been ill informed on local authority, existed from time immemorial, it cannot be accepted as a satisfactory explanation for the sudden disappearance of this butterfly. But even assuming that the disappearance of *L. Arion* might be due to this cause on the hills, commons, and sheep-walks, - both in the Cotswolds and in Devonshire, that would not account for the extinction of the species in the open spaces in the beech-woods, where, of course, from the nature of the surroundings, the burning of the grass has never been practised. Other persons have suggested that the extinction of *L. Arion* is due to the rapacity of collectors. This, I believe, may probably be the case where the species is confined to such a limited area as in the locality which I first described; but it seems incredible that an insect which was as common in 1877 as I have reported it, and which was distributed over an extent of ground nearly two miles in length, could have been suddenly exterminated.

It seems more probable that the sudden and total disappearance of *L. Arion* from the locality in which I found it so plentiful in 1877, may have been due to an unprecedented succession of mild winters, ungenial springs, wet and cold

Junes, and other unfavourable meteorological conditions, rather than to the burning of the grass - which, at least in one locality, had never been practicable - or the rapacity of collectors which could scarcely have been equal to the task of the extermination of nearly all the "common blues" and other species, which, together with *Arion*, had been plentiful in the same localities in 1877.

Surbiton,
Surrey
September 8th, 1884.

Scanned from Ent. Mon. Mag Vol XX1 (November 1884) pp133-134

On the probable extinction of *Lycaena Arion* in England.

Mr. Herbert Goss in his interesting paper "On the probable extinction of *Lycaena Arion* in Britain" (cf. Ent. Mo. Mag., xxi, 107), inclines to the opinion that the sudden and total disappearance of *L. Arion* from the Gloucestershire localities may have been due to an unprecedented succession of mild winters, &c. In this conclusion I can quite agree with him.

It may be observed, that although the abnormal meteorological vicissitudes experienced throughout Great Britain during the past six or seven years must have not only considerably checked the increase of many species of Lepidoptera, but have also greatly reduced the normal numbers of some other species, still, a series of unfavourable meteorological conditions during a period of several years would hardly lead to the extermination of those species which are generally distributed. Even the not unimportant assistance of the most assiduous collector and an occasional grass or furze fire would fail to effect so much. In the case, however, of local species, the chances of escape from such a combination of hostile agencies would be rather precarious.

With such species as *L. Arion*, confined to somewhat limited areas of widely separated districts, there exists what may be termed a predisposition to extinction, and a series of seasons meteorologically unfavourable may effect the extermination of the species, first from one and then another of its limited retreats, until its final extinction in the country would be accomplished.

By predisposition to extinction I mean, that when the limit of the range of a species is reduced to a very small portion of a district, independent of the range of its food plant, it may be assumed that that species is in danger of extermination from the operation of one or the other, or a combination of several unfavourable conditions. In effecting a "sudden and total disappearance", I should certainly consider unfavourable meteorological conditions to be the prime influence.

Almost the same remarks will apply to any species of Lepidoptera restricted to the limited habitat of its food plant; with this additional contingency, the food plant itself might be exterminated either by the occurrence of a land slip, or in the case of an annual plant, by some animal or animals devouring it; or the eradication of the plant might be effected by the improving hand of man.

According to Mr. Goss, *L. Arion* occurred in some numbers in two localities in Gloucestershire during the years 1876 and 1877. The species was rare there in 1878, and from that year to the present time not a single example has been captured in Gloucestershire.

Now, on the hypothesis that the issue of the 1877 *L. Arion* were, all, but a few, destroyed in one or other of the earlier stages by some unfavourable meteorological influence, the

scarcity of the imago in 1878 is accounted for. Mr. Goss does not say whether the few *L. Arion* seen in 1878 were captured or not, but any way, this would matter but little. Probably but few ova would be deposited, and the larvae, if any, resulting from them would, if not entirely annihilated by the wretched spring of 1879, have been so considerably reduced, as to come within a perilous distance of such an occurrence. Since 1879 the ungenial nature of our springs has precluded all chance of the species recruiting its numbers, but, on the contrary, has most probably completed the business of exterminating *L. Arion* from the Gloucestershire localities.

L. Arion still exists in South Devonshire (or did last year), and a few favourable seasons might tend to increase the numbers of the species in its particular haunts in that county; but I am afraid that its tenure on its Devonshire estate is not a very secure one, and that in the near future "the large blue" will be, as Mr. Goss suggests, extinct in Great Britain.

RICHARD SOUTH
12, Abbey Gardens
St. John's Wood
October 15th, 1884

Scanned from Ent. Mon. Mag Vol XX1 (January 1885) pp186-189

ON THE PROBABLE EXTINCTION OF *LYCAENA ARION* IN ENGLAND.

BY HERBERT W. MARSDEN.

As *Lycaena Arion* has been a species of great interest to me for many years, and as I have paid much attention to its appearance and distribution in this locality, a few notes from me may be of interest to the readers of the Ent. Mo. Mag.

It was on the 17th June, 1866, that I first saw the species alive; when, in the course of a long Sunday ramble, I captured a single specimen in a narrow valley amongst the Cotswold Hills. A few days later I took another, high up on the open common ground, and more than a mile from where the first was seen.

From that year until this I have regularly visited the localities I discovered during 1867-70. Since 1869 I have kept no regular diary, but only in 1870 did I find the insect really plentiful.

The early part of June, 1867, was dark and cold, and I only secured some twelve or fifteen examples of *L. Arion*, usually not more than two or three specimens in any one day: the first being seen June 20th. These were all taken at what we may call the Stroud end of the district, described by Mr. Goss on pp. 107-9 of this volume; nor was it until 1869 that I traced it northwards to other and more prolific localities.

The season, May and June, 1868, was hot and brilliant, and I found *Sesia tipuliformis* emerged in my garden as early as June 1st, *L. Arion* appeared June 5th, which is the earliest date I ever heard of the species being out; but although rather more plentiful than the previous year, it was still rather scarce.

In 1869 (another fine or partially fine season) it was more abundant, and I find from my diary that on June 19th I took ten at rest about sunset. Early the following morning I again traversed the ground, but saw none, so spent the day elsewhere; returning about five o'clock in the afternoon. I then saw over a score, of which I boxed about half, letting the others pass.

The year 1870, however, is the one to be marked with a white stone by the lovers of *Lycaenidae*. I have not my notes for

this year, but it was about the 11th June that *L. Arion* was first seen, and for the next ten or fourteen days it was fairly common, and it appeared much more widely distributed than in any other year I know of, either before or since. It would, I am sure, have been possible for an active collector, of the greedy school, to have caught over 1000 "large blues" during the season, for in a few visits I secured about 150, not netting half of those seen, and turning many loose again. Nor was it *L. Arion* only that was common; all the "blues" appeared unusually abundant this season, and one memorable evening, just at sunset, I found at rest on the long grass in a disused quarry, no less than seven *L. Agestis*, so close together on one stalk of grass, that I easily got six of them into a pill-box at the first attempt. Within a few inches were five beautiful *L. Arion* also at rest. These twelve butterflies were all within a space less in size than the crown of a man's hat. It may be in place here to note that when the weather has been fine and bright, and promises to continue settled, *L. Arion* rests at night high up on coarse stalks of grass, and is then very conspicuous; whereas, in dark unsettled weather, they betake themselves to low thick tufts of grass or nettles.

During the next few years *L. Arion* continued to appear, but very irregularly, as regards numbers. The best seasons since 1870 being those of 1876 and '77, the latter especially, but on no occasion has it been nearly so abundant as in 1870. As the years '76 and '77 have been fully described in Mr. Goss's paper, I need not dwell further upon them.

Now come the dark days. Part of June, 1877, was damp and broken; not at all the bright warm skies *L. Arion* loves (1876 was very hot for part of June). In dark cloudy weather they are always still, and, I believe, they will only deposit their ova when the sun is warm and bright. In 1878 the weather was worse, there being hardly a fine day in the month, 1879 was yet worse than '78, and since then until this season the same class of weather has been-prevalent. Now, during all these seasons I have gone or sent many times at the time *L. Arion* should be out. In 1878, not over a dozen were seen, mostly worn and weather-beaten, for there were hardly ever two consecutive fine days. In 1879 they were yet scarcer, while in 1880, if my memory serve me rightly, only two were obtained, and two or three more seen. For the four years, 1881-84, not one has been seen in the Gloucestershire district that I have been able to trace.

I will now say a few words about the distribution of *L. Arion*. Such years as it has been rare, it appeared to be entirely confined to two or three spots of very limited area, whereas when commoner, and especially in 1870, it cropped up here and there nearly all through the country between the two chief "head quarters" which are nearly three miles apart. It also occurs in two or three other localities, one of them being over ten miles away, but everywhere it is limited to small areas.

One point of interest would appear to be this. My friend Mr. Merrin used to take the species about a quarter or half a mile further west than I have ever done, and at that time he knew of no other locality. Since I have been acquainted with the species, not one has been taken in this old locality, although often visited at the right time. So local does it seem, too, that, although I have taken it freely up to a certain point, I could never find a specimen beyond the sides of this one old quarry, in the direction of the old head quarters, notwithstanding that

the formation of the ground, herbage, &c., appear identical with that where it was common.

Now, what is the probable cause of the diminution or extinction of *L. Arion*? To my mind the greatest, if not the sole, cause has been the continued prevalence of unfavourable weather, which alike caused an immense decrease in the blossoming of the wild thyme, and prevented free oviposition by the parent butterflies. It will be noted that with continued and increasing fine weather, 1866-1870, the species gradually increased also, until in 1870 it was common. Then followed broken seasons, with irregular appearance of the butterfly, but still in sufficient number to take advantage of the fine June of 1876. In 1877 they were commoner than in the previous year, but the month of June was partly broken. Many fewer butterflies appeared in '78, and they hardly had a chance of continuing the species; and from then until 1884, there has not been one fair season.

The question now is: have ANY survived this long series of bad years? If only a very few are left, with the finer June of 1884, and should we be favoured with a similarly fine month in 1885, there is hope that *L. Arion* may again become, if not abundant, still not so very rare; but I fear this hope is but a very faint one.

Burning the grass has, I think, become more prevalent over one of the localities noticed, and it must have had some bad effect; but the other has never suffered from this to any appreciable extent; so this cannot be the cause, although it may have been an assisting one. As to the "rapacity of collectors", I can say emphatically that it has had no share in the diminution of the species in the district in question. The locality towards Stroud is, I believe, known only to four or five people, including Mr. Goss, to whom I showed the ground in 1876. Only Mr. Merrin and myself have ever systematically visited the ground, and, as will be seen from the record of my experience as given above, no harm can have been done by me in this manner, and Mr. Merrin has never taken nearly so many as myself. In all my wanderings over the Stroud end of the ground I never met a stranger collecting, and only on one occasion, at the other end, and this was, I know, only a passing day's visit by an amateur. While, however, I am thus positive that over-collecting has not had anything to do with the disappearance of *L. Arion* here, I am none the less convinced that it would have been easy for one or two active collectors to have made a clean sweep of the species, and exterminated it in a series of two or three years, no matter how favourable the weather might have been. It has been this conviction that prompted me never to publish the exact locality, and also to be careful myself never to take all I saw, and generally to preserve the species as much as possible.

I have said nothing here about the larva of *L. Arion*, because nothing further appears to have been learnt of it since Mr. Merrin and myself supplied ova to Mr. Porritt and others in 1870. We then all saw the newly-hatched larvae feeding on blossoms of wild thyme, and that was the last of it. At different times I have spent many hours in search for older larvae without avail.

37, Midland Road,
Gloucester:
November 15th, 1884.