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BEDFORDSHIRE NATURAL HISTORY SOCIETY & FIELD CLUB

1948

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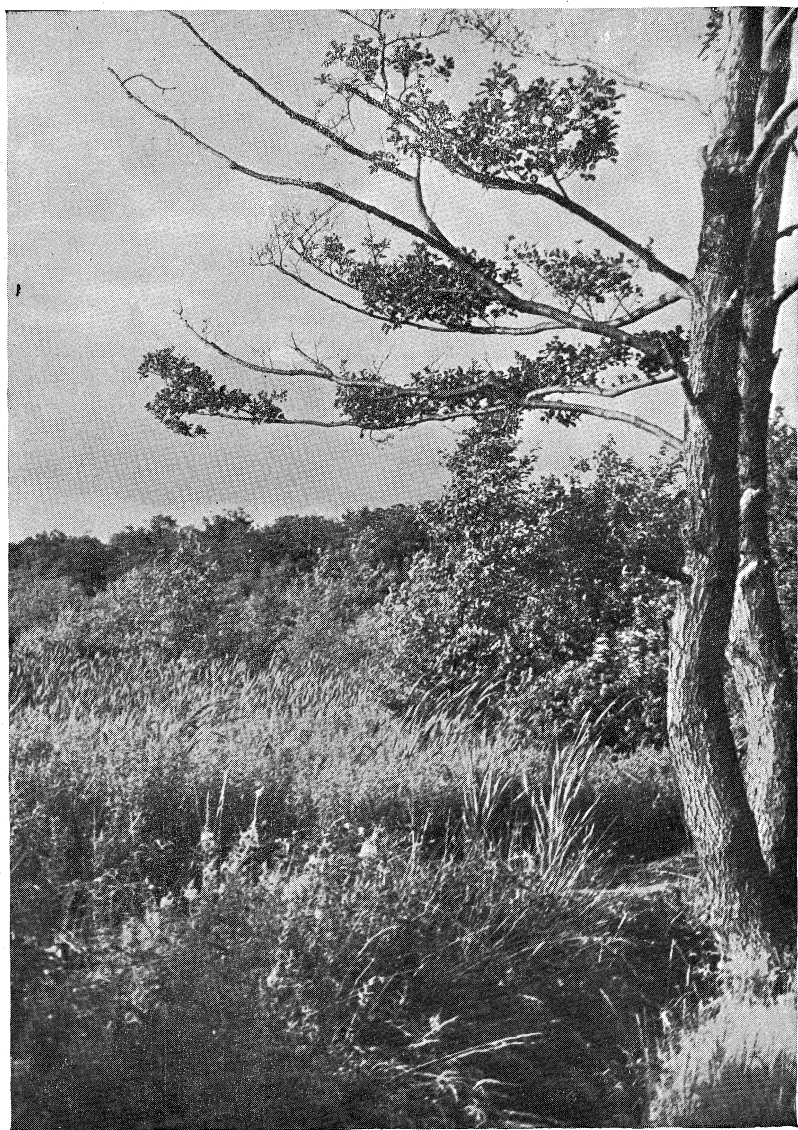
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Photograph by Ray Palmer.

FLITWICK MOOR

(See article on "Nature Reserves", p. 19)

JOURNAL

OF THE

BEDFORDSHIRE

NATURAL HISTORY SOCIETY

AND FIELD CLUB

EDITED BY RAY PALMER, F.R.E.S., F.Z.S.

No. 2.—1947

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REPORT OF THE HON. SECRETARY FOR 1947

The first whole year of the Society's existence will chiefly be remembered for a very ambitious programme most successfully concluded, and for the rapid increase in membership, which was more than doubled during the twelve months, over two hundred names being on the Society's register at the close of the year. Far more important than the increase in numbers, however, was the keen participation of members in most of the Society's activities.

Four lectures on a wide range of subjects (which are fully reported elsewhere) constituted the programme from January to April, and the speakers were all members of the acting Council and recorders for the Society.

During this period the Council met on several occasions and in the course of business elected Dr. J. G. Dony and Mr. Keith Piercy to constitute the Field Meetings Committee. Special consideration was given to the condition of Flitwick Moor, which had deteriorated in many respects from a natural history point of view during recent years, and the Council generally agreed that an ecological survey ought to be carried out in the area. This resulted in the establishment of the Flitwick Moor Ecological Survey Committee, whose elected members are Dr. J. G. Dony and Dr. V. H. Chambers, together with our editor, Mr. Ray Palmer.

The list of Field Meetings (also the subject of a separate report) was long, and some members wondered at the outset whether the Council had planned too extensive a programme. Eighteen general Field Meetings were held at a variety of widely separated localities; in addition the Ornithologists held three meetings in the county, and two more at Northampton Sewage Farm, while a party travelled by coach in perfect summer weather to the Norfolk Broads, where a memorable day was spent among the marshes.

On the whole the elements were kind during the summer, in sharp contrast to the severe wintry conditions of the early months, which made travel almost impossible. Two occasions which stand out and warrant special recognition, and which were in each instance exceptionally well attended, were the outing to Woburn Park, where His Grace the Duke of Bedford so affably conducted the party round his reserves, and the meeting at Whipsnade Zoo, so excellently arranged by Dr. G. M. Vevers, who acted as host on behalf of the Zoological Society of London. To these and others who gave their support so spontaneously and threw open their properties to the Society, we are indeed grateful. In consequence, long before the end of the summer, any fears of the success of these excursions had been dispelled. The Council further wish to thank all those who so kindly conveyed other members in their cars to and from these excursions.

The Society also desire to express their gratitude to the Head Master of Bedford School, to the Management of the Luton Borough Museum, to the Bedford County Headquarters of the St. John Ambulance Brigade, to the Society of Friends, Luton, and to others for

the loan of rooms for the purpose of meetings and for the offer of lanterns and other apparatus.

In September a sad note was struck by the death of our member, Mr. D. O. Boyd, B.Sc., of Bromham, who though bed-ridden at the time of joining the Society said in his letter that he was looking forward to the time when he would be able to take an active part in our various activities. His death is a great loss to us, as he was an authority on plant life, horticulture and entomology.

This month also witnessed a great occasion and a milestone in the Society's history. Through the kind combined efforts of Commander W. J. A. Willis, R.N., Chief Constable of Bedfordshire, and Admiral Sir Lionel Halsey, the Society was honoured with a visit by Mr. Peter Scott, the authority on Wildfowl, who lectured to a packed house of members and friends in the Town Hall. His outstanding address and the wonderful coloured films which were shown will long be remembered. Supporting him on the platform were our President, Mr. Oliver G. Pike, and Mr. James Fisher, M.A. As a result of this meeting the Society not only benefited financially, but many new members were enrolled.

Four autumn indoor meetings completed this year's programme. Illness unfortunately prevented our President from opening the Winter Session, but at short notice Dr. G. A. Metcalfe stepped into the breach and proved an ideal deputy. We are indeed grateful to Dr. Metcalfe for this further manifestation of his outstanding support.

The other lectures were delivered by the Recorder of Birds, Mr. Key; Mr. G. A. Nicholls, B.A., of Cambridge, who broke fresh ground with his address on the Geology of the County; and Dr. C. B. Williams, of Rothamsted Research Station, who gave a lively address on the cause of Insect Outbreaks.

The loan of the lantern for these lectures by Mr. Colin Crummie was deeply appreciated.

As a result of Mr. Peter Scott's visit, a party of members journeyed by coach on a Sunday in November to the New Grounds in Gloucestershire by the River Severn, in order to study the wildfowl, and in consequence many of them joined the Severn Wildfowl Trust.

As the year drew to a close, one or two resignations were received from members who had left the district and moved far away, one indeed (Dr. Holdsworth), to New Zealand. I am sure that we all extend to them our good wishes for the future in their new environment and we trust that they will not completely sever their connection with the Society.

Reviewing the past year, I feel that we can look forward to the future with sober confidence, and I appeal to all members to do their utmost to make known the activities of the Society and encourage many new members to join us.

HENRY A. S. KEY.

THE BEDFORDSHIRE NATURAL HISTORY SOCIETY AND FIELD CLUB

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STATEMENT OF ACCOUNTS FOR THE PERIOD ENDED 31st DECEMBER, 1947

RECEIPTS				PAYMENTS			
		£	s. d.	£	s. d.	£	s. d.
To Subscriptions 1946 and 1947—				By Cost of Journal	...	69	17 6
171 Ordinary Members	...	85	10 0	„ Printing	...	24	19 7
9 Student	„	3	7 6	„ Hire of Halls	...	6	9 6
37 Associate	„	9	5 0	„ Newspaper Advertisements	...	2	0 0
8 Junior	„	1	0 0	„ Postages—Secretary	...	3	15 0
			99 2 6	„ „ —Treasurer	...	17	9
„ Subscriptions for 1948	...		4 5 0	„ Hiring Appliances for Lantern Lectures	...	17	6
„ Donations	...		2 7 0	„ Stationery	...	3	19 10
„ Collections	...		2 2 0	„ Cheque Book	...		5 0
„ Public Lectures	...		43 0 8	„ Balance at Bank, 31st December, 1947	...	38	14 5
„ Conversazione	...		3 14 0	„ Cash in Hand	„	9	15 3
„ Sale of Journals	...		7 0 3				
			£161 11 5			£161 11 5	

We have examined the above account with the books and vouchers of the Society and certify the same to be correct in accordance therewith.

(Signed) McPHERSON, TIMMINS & EDNIE,
Chartered Accountants, Honorary Auditors.

BEDFORD.
2nd February, 1948.

STATEMENT OF ACCOUNTS

PROCEEDINGS, SESSION 1947

1ST ORDINARY MEETING, held on Thursday, 16th January, 1947, at the Science Lecture Theatre of Bedford School, Mr. Keith Piercy in the Chair. About 100 members and visitors were present.

The speaker was Mr. Ray Palmer, F.R.E.S., who gave a lantern lecture on the subject of "Pond Life". Illustrated by slides from his own photographs, Mr. Palmer dealt with the animal life of a typical pond, starting with the amphibians and concluding with the protozoa. He stressed the ecological aspect of the subject and emphasised the interdependence of the various forms of plant and animal life in an aquatic environment.

An interesting discussion followed, and the Chairman in thanking the speaker said everyone would agree that the lecture had provided a great send-off for the Society's first winter session. Mr. E. C. Brown acted as projectionist. Several new members were enrolled.

2ND ORDINARY MEETING, held on Wednesday, 12th February, 1947, at the Friends' Meeting House, Castle Street, Luton, Mr. Keith Piercy in the Chair. About 37 members were present.

The subject was "The Birds of Bedfordshire", dealt with jointly by the Chairman—Mr. Keith Piercy, B.Sc., and the Hon. Secretary—Mr. Henry A. S. Key. Mr. Piercy spoke mainly on the methods of bird watching, and the changed outlook on birds that had taken place during the past fifty years. Mr. Key described the geology and geography of the county in relation to bird life and migration, the status of species on the county list, and suitable haunts for observing some of the more interesting visitors and passage migrants, illustrating his remarks with a large-scale map. Considerable discussion followed, at the close of which Dr. J. G. Dony proposed a vote of thanks to the speakers. Several new members were enrolled.

3RD ORDINARY MEETING, held on Thursday, 2nd March, 1947, at St. John Ambulance Brigade Hall, Cauldwell Street, Bedford, Mr. F. G. R. Soper in the Chair. About 80 members were present.

Mr. Soper stated that the Chairman—Mr. Keith Piercy—was unwell, mainly due to travelling to the Society's meetings during the recent severe weather, and wished him a speedy recovery. The speaker was Dr. J. G. Dony, the Society's recorder for Botany, who gave a most interesting and instructive address on "The Flora of Bedfordshire". After mentioning Abbott's "Flora Bedfordiensis", published in 1798, and the work of other early botanists in the county, Dr. Dony dealt with the geography of Bedfordshire and its effect on the distribution of plant life. He went on to mention the plants recorded in the various orders, drawing attention to the rare and interesting species. The north-east of the county appeared to be the most neglected from a botanical point of view, having been much less worked than the other regions. After much lively discussion and numerous questions, the

Chairman thanked Dr. Dony for his excellent address. Several new members were enrolled.

4TH ORDINARY MEETING, held on Wednesday, 16th April, 1947, at the Friends' Meeting House, Luton, Dr. V. H. Chambers in the Chair. Thirty-one members and visitors were present, and several new members were enrolled.

The subject of the meeting was "Insect Life", and this was dealt with by four speakers who were the Society's recorders for various orders.

Mr. C. MacKechnie Jarvis, F.L.S., gave a general account of the Coleoptera, indicating the immense number and variety of the beetle fauna of Britain and the world at large, illustrating his remarks by specimens. He then spoke of the progress that had been made in the study of Coleoptera in Bedfordshire and the great scope for further work in the county.

Mr. Bernard Verdcourt, B.SC., followed, and for the benefit of the non-entomologists present gave a broad outline of the various orders of insects, indicating the state of our knowledge of them in the county, and particularly mentioning the more neglected groups, which provided great scope for investigation.

Dr. V. H. Chambers, PH.D., dealt with the Hymenoptera, for which he is the Society's recorder. He mentioned the various divisions of the order and the characteristics and modes of life of the different groups, dealing particularly with the Sawflies and Aculeates to which he has devoted special attention.

Mr. Ray Palmer spoke first about the Odonata, saying that an extensive list of dragonflies had already been recorded, and following with a brief account of the Orthoptera, saying that our knowledge of the grasshoppers and allied insects in the county was still very incomplete. Specimens were exhibited by all the speakers and photographs of insects shown by Mr. Ray Palmer. An interesting discussion followed and the various speakers replied to questions.

5TH ORDINARY MEETING, held on Wednesday, 15th October, 1947, at the Friends' Meeting House, Luton, Mr. F. G. R. Soper in the Chair.

The Chairman announced that the President—Mr. Oliver G. Pike, who should have been the lecturer, was unfortunately ill and unable to be present. Dr. G. A. Metcalfe, M.A., had at short notice agreed to fill the gap with a lecture on birds. The lecture proved to be a most fascinating talk on "Sea Birds", which Dr. Metcalfe illustrated with his own remarkable cinematograph films, some of which were in colour. The audience was most appreciative, and the Chairman thanked the speaker for a memorable evening's entertainment. The Hon. Sec. made various announcements and several new members were enrolled. About 40 people were present.

6TH ORDINARY MEETING, held on Thursday, 6th November, 1947, at St. John Ambulance Brigade Hall, Bedford, Mr. F. G. R. Soper in the Chair. Thirty-two members were present.

Mr. Henry A. S. Key gave a lecture on "The Wildfowl of Bedfordshire", illustrated by lantern slides. The geographic position of the county in relation to the migration routes was described, pointing out how the migrants mainly follow the river valleys and pause on their journeyings at various pools and waterways. He stressed the great importance of winter bird-watching for observing the movements of wildfowl, and described the various species of ducks, geese and swans that had been recorded in the county. The lecturer finally showed a number of slides from his own colour photographs depicting the more important haunts of wildfowl in Bedfordshire. Some questions and discussion followed, after which the Chairman thanked the lecturer for his interesting address and complimented the members present for turning out on such a foggy night.

7TH ORDINARY MEETING, held on Wednesday, 26th November, 1947, at the Friends' Meeting House, Luton, Mr. F. G. R. Soper in the Chair.

The speaker was the Chairman of the Society, Mr. Keith Piercy, B.Sc., and accordingly Mr. Soper presided over the meeting. Mr. Piercy's subject was "Areas of Special Interest in the County", and these were considered with a view to possible or desirable nature reserves. After mentioning the activities of the Nature Reserves Investigation Committee, the speaker described the various natural areas worthy of preservation. The principal areas considered were the chalk hills (which form part of the Chiltern Conservation Area) and Flitwick Moor, which is almost unique in the county as a natural peat bog. Dr. Dony made further comments, particularly on Flitwick Moor, and several other members contributed to the discussion. It was evident that all members present were keenly interested in the preservation as natural reserves of the areas in question.

8TH ORDINARY MEETING, held on Friday, 12th December, 1947, at the Science Lecture Theatre of Bedford School, Dr. V. H. Chambers in the Chair. About 40 members were present.

The speaker was Mr. G. D. Nicholls, B.A., who gave a lantern lecture on "An Introduction to the Geology of Bedfordshire", the substance of which appears in the present JOURNAL. Starting at the north the lecturer described the main formations of the county, dealing particularly with the limestones of the Sharnbrook area and their fossils, the cornbrash, the Oxford clay covering all the north of the county, the greensand ridge, the gault and the chalk hills of the south. Mention was also made of the drift, the various glacial and river deposits overlying the main formations. The lecture stimulated great interest among the audience and many questions and much discussion followed. It was considered that some geological field meetings should be held, and Mr. Nicholls said he would be pleased to co-operate. At the close Dr. Dony expressed the thanks of the meeting to the speaker for his most informative lecture. Mr. E. C. Brown acted as projectionist.

FIELD MEETINGS

The field meetings arranged for the first season were largely experimental in character, and were therefore very varied in nature, as it was difficult to estimate what response would be shown by the members. The largest attendance was at Woburn Park on 12th July, when his Grace the Duke of Bedford conducted some 70 members on a tour that none will forget. The smallest attendance was a visit to Flitwick Moor on 27th July, when four members braved the heat of one of the most scorching days of the year. This visit was one of five arranged to study the plant ecology of the Moor, of which it is hoped in time to make a complete survey.

A very popular and successful excursion was to Whipsnade Zoological Park on 13th September, when Dr. G. M. VEVERS was our host. Field meetings of a somewhat unusual character were the all night meetings at Stagsden on 24th-25th May, when the bird evensong and dawn chorus failed to come up to expectation owing to weather conditions; the excursion to Norfolk on 1st June, when Rockland, Alderfen and Hickling Broads were visited through the co-operation of the Norfolk and Norwich Naturalists' Society; the fungus foray at King's Wood, Heath and Reach, on 12th October, which produced poor results due to the drought; and the excursion to Gloucestershire on 17th November, to see the wild geese on the reserve of the Severn Wildfowl Trust.

A joint meeting with the Letchworth Naturalists' Society at Barton Hills on 16th August, provided a welcome link with a neighbouring society, and it is pleasing to note that Letchworth naturalists joined us at other field meetings, notably at Flitwick Moor. Several members of the Hertfordshire Natural History Society also joined the Flitwick Moor meeting on 31st August.

Special ornithological excursions were made three times to Northampton Sewage Farm (27th April, 7th September and 12th October), and twice to Bedford Sewage Farm (22nd May and 30th November), while other visits were made to the riverside in the Willington and Bromham districts (15th June and 28th December).

Meetings of a general nature took place to Great HAYES Wood (18th May), Totternhoe (14th June), West Wood, Knotting (6th July), and Cockayne Hatley (3rd August). Four evening meetings were also much appreciated; these were to Warden Hills (10th June), Bromham Meadows (25th June), Clapham Park (17th July) and Cooper's Hill, Ampthill (23rd July).

To have arranged and carried out no less than 28 field meetings and excursions in nine months was no small achievement in the Society's first year. Our thanks are due to the various leaders and organisers, and also to the many members and friends who so greatly helped in the transport arrangements by conveying other people in their cars.

INTRODUCTION TO THE GEOLOGY OF BEDFORDSHIRE

By G. D. NICHOLLS

To a considerable extent the surface of Bedfordshire is made up of Drift deposits (see map) which largely obscure the solid formations below, but sufficient of these are exposed to enable the broad outlines of the Solid geology to be understood. Drift deposits are usually very variable in lithology, thickness and extent, and rest upon the underlying Solid formations with no consistent relationship, being dependent on the topography for their occurrence. They include the Boulder Clay of the north and centre of the county, the Chalky-Clay-with-Flints of the south, and the valley gravels of the main streams, besides minor gravel and brick-earth deposits elsewhere, and are usually only a million years or so old. The Solid formations are much older, being of the order of 100 million years, and are usually of considerable extent, often being continued beneath the surface for several miles from their exposures. They are more constant in character and often of appreciable thickness. In view of their greater age it is more convenient to treat these older formations first.

The oldest rocks coming to the surface in Bedfordshire are found in narrow strips bordering the Ouse between Turvey and Stevington. They are of Middle Jurassic age (about 135 million years old) and are chronologically equated to the Great Oolite Limestone in other parts of the country. In Bedfordshire, limestone is the predominant rock type, occurring in bands one to ten feet thick separated by thin clay or marl bands, the whole formation having a maximum thickness of about 30 feet. The limestone shows very little of the oolitic character and is a yellow to buff rubbly limestone, in places varying to a dirty grey or blueish colour, with some signs of current-bedding. Shells are found in these limestones quite commonly, especially two oysters, *Ostrea hebridica* Forbes and *Ostrea subrugulosa* Morris and Lycett; also occurring are *Modiola imbricata* J. Sowerby, *Natica*, *Ornithella* and *Kallirhynchia concinna* J. Sowerby, echinoids, etc. (Chatwin¹).

The succeeding Blisworth Clay formation is only a few feet thick and rests impermissibly on the limestones. It is variable in colour, at times slightly calcareous, and contains similar fossils to the above, especially the two oysters.

Still occurring as a thin strip along the Ouse the next highest formation is again limestones—the Cornbrash Limestones—so called because they weather to a stony or brashy soil very suitable for the growth of corn. They were originally well exposed in a brick pit north of Bletsoe, but through disuse and the conversion of the site to a Ministry of Supply dump they can no longer be seen. Elsewhere their presence has chiefly to be determined by a study of ditch sections, etc. The Bletsoe sections indicated that both the Upper and Lower Divisions are represented in Bedfordshire, although the total thickness of the formation is only about three feet and the sharp boundary between the two parts, commonly found in other parts of the country, is not

striking in this occurrence. At Bletsoe 1ft. 3ins. of tough brown limestone is overlain by sandy and calcareous fissile layers (1ft. 6ins.) (Chatwin²). The contained fossils indicate that the break between the Upper and Lower Divisions is a very important one, and it is usually accepted as the boundary between the Middle and Upper Jurassic—the ammonite *Clydoniceras* and the small shell *Pseudomonotis echinata* J. Sowerby characterise the Lower, and the ammonite *Macrocephalites* with the oyster *Ostrea marshi* J. Sowerby the Upper Cornbrash while other fossils occurring are the brachiopods *Ornithella obovata* J. Sowerby and *Microthyris lagenalis* Schlotheim.

The Kellaways beds which overlie the Upper Cornbrash do not form marked exposures, but are met with in boreholes in the Bedford area, and also in shallow diggings, etc., put down in the "knot-holes" of Oxford Clay, e.g., at Stewartby. In Bedfordshire these beds attain a thickness of ten feet or so and comprise a blueish sandy clay below, with a sand above that may contain "doggers"—irregular concretionary masses. The clay is often almost unfossiliferous, but the sand may contain the bivalves *Pleuromya recurva* Phillips, *Oxytoma expansa* Phillips and *Gryphaea bilobata* J. Sowerby. The ammonite *Sigaloceras calloviense* J. Sowerby occurs here also.

The overlying Oxford Clay was originally probably over 500 feet thick, although uplift along the Ampthill line and subsequent erosion prior to the deposition of the Greensand has caused reduced thickness in the Ampthill district and to a less extent over most of the county. The clay is well exposed in the pits or "Knot-holes" of the London Brick Company at Stewartby and also at other workings at Kempston Hardwick, Brogborough, etc. It is a stiff tenacious clay becoming shaly and almost laminated at times, and is not homogeneous throughout. Towards the base it is of a definite greenish-grey colour, but higher up it takes on more of a blueish colour and in the highest beds, as exposed outside Bedfordshire, it is a real blue-grey. Segregation of calcium carbonate results in the formation of thin limestone bands at times and concretionary nodules are of quite frequent occurrence up to four feet or so in diameter, with the cementing material usually yellowish or clear selenite (hydrated calcium sulphate). Pyrites is sometimes found, especially replacing fossils, but is less common than the selenite. On weathering the clay takes on a deep brown colour due to oxidation of iron. Fossils are frequent throughout the formation and some bedding planes are absolutely covered with tiny shells, e.g., *Nucula*, *Modiola bipartita* J. Sowerby is quite common, and one of the most striking remains is the belemnite guard *Cylindroteuthis oweni* Pratt. The bones of several kinds of huge reptiles may be found, and fish scales also occur. Ammonites are frequent enough to be used to distinguish subdivisions in the Oxford Clay, and from the use of these organisms it can be shown that only the lower subdivisions of the Oxford Clay are represented in Bedfordshire. Characteristic ammonites are *Kosmoceras* of the *elizabethæ* and *duncani* groups, but they are rarely well preserved, being usually badly flattened. The marine annelid *Serpula vertebralis* J. de C. Sowerby is another fossil here worthy of mention.

At some places in the clay face at Stewartby indications of sedimentary rhythm can be worked out and the grumbling earth movements which caused this effect began to assert themselves in stronger force at the close of the Oxfordian times, so that a low crest-line rose above the waves along a line N.N.W.—S.S.E. slightly to the west of Ampthill. Erosion then removed the higher divisions of the Oxford Clay before the rising seas once more swamped over the ridge to deposit beds of Corallian age.

These beds occur in the east of the county around Sandy where they were at one time exposed in a small brick pit (but see notes on the map) now fallen into disuse and flooded. They do not occur further west than Southill, although earlier records (Chatwin³) show that a very good section through beds of this age was opened up during the cutting of Ampthill tunnel. A rubbly rock bed (4ft. 6ins.) occurs at the base with *Exogyra nana* J. Sowerby, and other shells, and is overlain by about 56 feet of clay. This so-called Ampthill Clay is very dark, almost black, and has a three feet thick band of hard grey limestone near the middle, usually fossiliferous, with *Trigonia clavellata* Parkinson and *Nucula menkei* Roemer. The clay itself contains *Gryphaea dilatata* J. Sowerby, *Thracia depressa* J. de C. Sowerby and the belemnite *Pachyteuthis excentrica* Blainville, and the larger of these shells are often encrusted with worm-tubes. The Sandy exposure originally showed a similar rubbly basal bed, usually considered to be the equivalent of the Oakley beds occurring farther west.

Kimmeridge Clay, the next succeeding formation was probably laid down over much of the area, but was removed by pre-Greensand erosion. A few feet was reported from the Ampthill cutting section, but it is not exposed elsewhere in the county.

It is conceivable that some Portlandian was deposited in this area, but none was exposed in the above section. Boreholes put down in the Luton area might possibly be found to pass through it in the future.

Considerable uplift with folding along an axis just east of Ampthill occurred towards the close of the Jurassic period with erosion of the existing formations so that the Lower Greensand (the overlying formation) rests sometimes on Kimmeridge, sometimes on Ampthill and sometimes on Oxford Clay—in geological terminology it is said to be unconformable on the Jurassics and this unconformity is one of the major geological breaks in the county separating the relatively low claylands of the north of the county from the dip and scarp topography of the south.

The Lower Greensand scarp forms a striking topographical feature from Woburn in the west, through Ampthill, to Sandy in the east. It gives rise to a light porous soil bearing a distinctive vegetation—another result of its porous nature is its widespread importance as a water-bearing stratum. Economically it is also important on account of the variety of the sands—the white highly quartzose glass sands of Leighton Buzzard are world-famous, and smaller sand-pits have been opened in many places for local supplies, for building, etc., while recently excavation has been resumed at Clophill for moulding sands.

It is believed that the Greensand deposits of Bedfordshire were deposited in straits of intermittent existence connecting the northern

Wealden seas to the southern Wealden Lake. It has been suggested by Dr. Rastall⁴ that the Lower Greensand material was deposited in two basins from the south-west and north-east these basins being separated by a ridge that was often land along the line of the Sandy or Charnwood Axis⁴. He has also brought forward evidence for a second arch parallel to the first, running from Nuneaton past Leighton Buzzard. Whatever the detailed geography of the period, it is certain that Bedfordshire was a region of shifting changing sand-banks occurring in straits characterised by strong rapid currents.

The base of the formation is marked by a thin bed of derived Jurassic fossils and stones with some fragments of older rocks, e.g., vein-quartz, chert, quartzite and fragments of Palaeozoic grit and slate. Replacement of the original material of some of these fragments by calcium phosphate has given rise to phosphatic nodules or coprolites in certain localities, e.g., Potton where they were originally found in the pit, now disused, near the church.

The bulk of the formation is of yellowish brown ironsands, but at Woburn where they are 220 feet thick, they contain a thin band of fuller's earth just below the centre. Percolating waters are probably the reason for the solution and re-deposition of iron into iron-pan where the sand is cemented into impermeable bodies—a characteristic feature of the Lower Greensand.

Fossils are practically non-existent in the Lower Greensand. If they were present originally they would probably be very much crushed and broken so that only the stoutest would persist, and even these would probably be removed by percolating waters. They might therefore be found in the sand immediately beneath the layers of pan, or as casts in the iron-pan. The exposures in the road cutting just north of Clophill show several suggestions of fossil casts in the pan, but nothing certainly recognisable has yet been found.

In conformable succession above, and therefore to the south of, the Lower Greensand, the Gault Clay forms a narrow strip right across the county. Having been originally worked for bricks the Gault is now exposed in a series of shallow workings, e.g., near Harlington. It is a stiff grey clay, sometimes tenacious, and rather dark in colour. It is 230 feet thick at Totternhoe, but it thins to the north and the east. The lowest zones of the Gault are missing (deduced by comparison with the European succession) but some of the unfossiliferous sands considered to be Lower Greensand are possibly deposits of Gault age. One of these lowest zones is, however, represented over a restricted area in the Leighton Buzzard district as a sandy bed below the clay, containing in gritty phosphatic nodules the ammonite *Leymeriella regularis* Bruguiere after which it is named. Worn fragments of ironstone and limy material also occur, probably the remnants of a more extensive deposit, and the latter contain *Leymeriella tardefurcata* and numerous brachiopods, e.g., *Terebrirostra lyra* J. Sowerby, *Terebratella menardi* Lamarck, *Rhynchonella mirabilis* Lamplugh and Walker, and *Kinvena*. Sometimes this limestone is in quite appreciable lenticels, and has been termed the Shenley Limestone from its occurrence in the Shenley Hill district. It dies out to the south, and only the phosphatic

nodules and the ironstone remain. These deposits have been extensively studied and their faunas and lithology cannot be fully discussed here. The interested reader is referred to Arkell⁵ and Toombs⁶.

Upper and Lower Gault both occur, but the former contains a much higher percentage of lime (up to 50 per cent. in places) and it increases upwards into the overlying deposits. Phosphatic nodules are scattered throughout, but occur more frequently in layers at the base of both upper and lower divisions. The Gault contains quite a prolific fauna among which may be mentioned the ammonites *Hoplites*, *Euhoplites*, *Douvilleiceras*, *Pervinqueria*, etc., the small belemnite *Neohibolites listeri* Mantell, and the bivalves *Inoceramus concentricus* Parkinson, *Nucula pectinata* J. Sowerby, *Plicatula gurgitis* Pictet and Roux, with brachiopods, e.g., *Terebratula buplicata* J. Sowerby and rarely corals, e.g., *Trochocyathus angulatus* Duncan. *Inoceramus sulcatus* Parkinson is distinctive of the Upper Gault.

The upper part of the Gault passes by a gradual transition into a calcareous marl by increasing lime content—this Chalk Marl is the lowest division of the Lower Chalk (see text—Fig. 1). The calcareous part of these deposits, as indeed of the chalk, as a whole is derived in part from the skeletons of millions of minute marine animals, and in part from chemical precipitation. Coccoliths and rhabdoliths figure largely in the remains, but finely crushed fragments of larger fossils are quite frequent, e.g., prisms from *Inocerami* shells. The Chalk Marl usually makes a sloping shelf at the foot of the chalk escarpment which forms a striking topographical feature from east to west of the county. It is a soft greyish marl seventy to eighty feet thick, and becomes more massive in its higher parts. Ammonites are quite frequent, *Schloenbachia varians* J. Sowerby and *Mantelliceras mantelli* J. Sowerby being characteristic. Pectens are quite common and especially in the Houghton Regis area are outlined or stained with a brownish iron oxidation product. Economically this formation is of considerable importance, as its constitution is almost exactly that of the raw material of the cement industry, with the result that numerous pits have been opened in it as at Houghton Regis, Sundon, etc.

The Totternhoe Stone overlying the Chalk Marl is a compact rather yellowish grey hard chalk 22 feet thick at Totternhoe, but thinning to the N.E. It is often cut by peculiar rather curved joint-planes, that result in a rather blocky form on weathering—green coated nodules are often found towards the base—the green coats being due to a thin film of complex silicate of iron (glauconite) around nodules of chalk. Fossils are quite common in the lower parts and *Chlamys fissicosta* Etheridge is quite typical. The other types occurring are those found throughout the Lower Chalk (see below).

Overlying the Totternhoe Stone is about 100 feet of Grey Chalk—a tough grey chalk becoming whiter in the upper part, and again showing the curved joint-planes rather more commonly than the Totternhoe Stone. *Holaster subglobosus* Leske is usually taken as the most characteristic fossil but bivalves are quite frequent, e.g., *Inoceramus crippsi* Mantell, *Plicatula inflata* J. de C. Sowerby and *Lima globosa* J. Sowerby. Ammonites of the genus *Acanthoceras* are quite frequent but are be-

coming appreciably less so—the onset of the ultimate extinction of this group of animals at the end of Cretaceous Times. Brachiopods are quite common, e.g., *Ornatothyris sulcifera* Morris and Davidson, *Rhynchonella grasiana* d'Orbigny, *Rhynchonella mantelliana* J. de C. Sowerby, and *Rhynchonella martini* Mantell. *Pleurotomaria*, *Turbo* and *Trochus* are characteristic molluscs, while among the echinoids *Discoidea* and *Holaster* are represented.

The Belemnite or Plenus Marls are usually taken as the upper limit of the Lower Chalk. They consist of thin layers of marl with a band of hard limestone between them. The marls are yellowish in the exposure at the top of the Totternhoe excavations, which have been opened largely in the Grey Chalk. The bed takes its names from the occurrence of *Actinocamax plenus* Blainville—a belemnite restricted to this layer.

The basal bed of the Middle Chalk is the so-called Melbourn Rock—ten feet of very hard yellowish chalk often containing numerous small nodules. The overlying chalk is variable in colour sometimes being creamy, sometimes white, and sometimes grey. The commonest fossils are brachiopods, lamellibranchs, and echinoids. In the lower part *Rhynchonella cuvieri* d'Orbigny, *Inoceramus labiatus* Schlotheim and *Discoidea dixonii* Forbes are characteristic, while in the upper *Terebratulina lata* Etheridge, *Inoceramus lamarcki* Parkinson. *Conulus subrotundus* Mantell and *Hemaster minimus* Agassiz are distinctive. Flints appear for the first time in the Middle Chalk, they are scattered in the lower part and frequent higher up—they result from the segregation of silica, which in the Lower Chalk is dispersed evenly throughout the chalk. Another “first appearance” is the heart-urchins—*Micraster* makes its appearance as *Micraster corbovis* Forbes in the upper part of the Middle Chalk to undergo a very interesting course of evolution in the Upper Chalk. An echinoid *Echinocorys scutatus* Leske is also found in the Middle Chalk of this area, whereas elsewhere it rarely occurs below the Upper Chalk. The Middle Chalk is about 200 feet thick and is exposed in the pit on Dunstable Downs.

The next distinctive rock band is the Chalk Rock—usually taken as the base of the Upper Chalk. Green coated nodules are distinctive, and the band contains a rather peculiar assemblage of fossils, mostly casts and moulds known as the Reussianum fauna after *Hyphantoceras reussianum* d'Orbigny, a loosely coiled ammonoid. Denudation has removed much of the Upper Chalk in this area and very little remains above the Chalk Rock.

Eocene beds were probably originally deposited over this area (see later discussion of Clay with Flints) but none now remains as such. The Chalk had suffered considerable uplift and erosion before the deposition of these Tertiary deposits, this deformation being an early manifestation of the pronounced Miocene folding—the effects felt in Britain of the tremendous epoch of mountain building that formed the Alps. This Miocene folding threw the whole of S.E. Britain into wide sweeping folds, one result of which is the southward tilt of all the formations exposed in Bedfordshire. A syncline or downfold runs nearly east-west through London with its axis sloping down to the east,

and Bedfordshire lies on the N.W. side of it. As a result the strata here all dip to the S.E. This dip is the reason why erosion down to a more or less level surface has exposed progressively older rocks to the N.W.

The Drift deposits of Bedfordshire though coming late in geological time, are of extensive occurrence. The oldest of them are the deposits connected directly or indirectly with the Ice Age, about a million years ago. Since a time sequence is very difficult to work out, on account of the patchy distribution of outcrops, the one enunciated below is only provisional and can only be taken as a working hypothesis until more data becomes available.

Valley gravels, alluvium peat—youngest.

Peat.

Glacial gravels and brick-earths.

Boulder Clay.

Clay with Flints—oldest.

The Clay with Flints occurs as a fairly extensive capping to the Chalk in southern Bedfordshire—it probably occurred as a sheet resting on an irregular surface, and varying from a few feet to 30 feet or more, but has been dissected by dry valleys into the present distribution. It occurs as accumulations of brown to reddish clay containing unworn flints, rounded pebbles and quantities of sand which have been referred to an Eocene age. Part of this material is probably the product of long continued leaching of the chalk in situ, and part derived from the destruction of Eocene deposits. No stratification is seen in the deposits, and they have probably been thoroughly mixed up by glacial action. Since the deposits are cut by the dry valleys, the leaching effects must have been largely, if not wholly, pre-glacial giving rise to a somewhat sandy deposit that was to suffer later churning up by the ice.

The Chalky Boulder Clay, which is the most extensive of the Drift deposit, is a product of the second of the four glacial maxima. It forms a huge spread in the north of the county but is also widespread about the centre, e.g., it is well exposed in an overgrown pit by the L.M.S. railway between Westoning and Harlington. As the principal physical features were already in existence its distribution is governed by the topography—it originally formed spreads in the Gault vale and north of the Greensand ridge to be subsequently dissected by erosion and deepening of the existing valleys during the last million years. It is as much as 50 feet thick in places, though elsewhere it is but a thin veneer. The clayey matrix is variable in colour, sometimes being blueish, greyish or yellow, or sometimes streaky. The boulders are largely derived from the Cretaceous or Jurassic rocks but more far-travelled erratics are quite frequent—pebbles of Bunter quartzite, Millstone grit, Yoredale shales, Carboniferous limestone and even basalts occurring. The latter, first brought to my notice by Mr. J. W. Kent of Harlington, in September, 1946, show close affinities to the basalts of the Edinburgh district and contain a very beautiful mauve titaniferous augite when examined under the microscope. The locally derived pebbles include pebbles of the harder bands in the Chalk, flint nodules often still angular, ironstone boulders from the Greensand, tabular flint (probably from Lincolnshire, however) and belemnite

guards from the Oxford Clay. The size of the boulders vary from an inch or less, up to 67 feet thick in the case of a transported mass of Amphill Clay embedded in the Boulder Clay at Biggleswade.

The so-called Glacial Gravels as occurring at Toddington, and exposed near Fancott in the gravel pits, are believed to be remnants of wider deposits dropped from streams of glacial melt water during the retreat of the ice. Much work remains to be done on these gravels, and little can be said at this stage. The Brick earths of the Biggleswade district are similarly only poorly known, and little can be said about them. They are loamy sands and are probably of similar age and origin to the gravels.

Peat deposits occur in the river valleys, notably at Flitwick Moor. The age of this peat is not certainly known, but possibly it began to form during the waning stages of the Ice Age when the subsoil was possibly frozen or water ponded back in the Flit consequent upon the abnormal drainage systems.

Alluvium and valley gravels of recent (younger than 25,000 years) origin occur in most of the principal valleys. They result from periods of aggradation corresponding to a relatively high sea level, elucidated by several workers, and admirably summarised by Godwin.⁷

However gradually, the face of Britain is being continually changed and the present geological distributions are the result of slight changes, such as erosion, and deposition, during the last few thousands of years. The land evolves at an infinitesimal rate, so small in fact that many blithely believe that the hills and valleys have and will endure for ages. This introduction can be little more than an antithesis to such an idea, but it is to be hoped will serve as a groundwork for all who wish to pursue the fascinating study of the rocks, and realise that the term "fossil" can be something more than a mere idiom of abuse.

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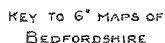
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THE GEOLOGICAL MAP

From the literature some doubt obviously exists as to the true age of the clay marked on this map as Amphill Clay.

My own field work inclines me to the view that the clay is probably equivalent to Amphill Clay, but I would await further faunal evidence before making a definite statement.

(The Society is much indebted to Mr. A. J. Newson for preparing the final drawing of Mr. Nicholls' map for reproduction.—ED.)

[illegible]

GEOLOGICAL SKETCH-MAP OF THE COUNTY OF BEDFORD
(Much generalised)

By G. D. NICHOLLS, B.A.

Certain boundaries are based on the Geological Survey, by permission of the
Controller of H.M. Stationery Office.

THE WEATHER IN 1947

By A. W. GUPPY

The year 1947 will long be remembered for its extremes of weather. Many long-standing records were broken, notably those relating to continuous high and low temperatures, drought, snow, and sunshine, and it must be exceptional for a single year to compass such remarkable variations.

The first three weeks of January were not abnormal, apart from an unusually mild and sunny day on the 16th, but by the 20th an easterly air current had become established, due to intense anticyclones over eastern Europe and the Baltic, and persisted for 34 days. There were frequent snowfalls during this period, but owing to the persistent low temperatures the snow lay unmelted for no less than 51 days, from 25th January to 16th March. Air frost occurred on 55 consecutive nights from 19th January to 15th March, being particularly severe on the nights of 23rd and 24th February when air temperatures of 6°F. and 7°F. were recorded. At Cranfield an air temperature of 0°F. was recorded on the night of 23rd-24th February.

March was very unsettled and the wettest during the present century. The heavy snowfalls of the 4th and 5th were followed by further rain and snow causing the severe flooding of the Ouse during the third week of the month. The 16th was notable for an intense and destructive gale which reached wind speeds of over 95 miles per hour in parts of East Anglia.

April and May were mild and free from air frost. There was an outstanding period of hot sunny weather between 28th May and 4th June, over 10 hours of sunshine being recorded daily, and the temperature reaching 90°F. on 3rd June. This was, in fact, the hottest day of the year. There were further periods of close, thundery weather between 26th and 28th June, 13th to 16th July and 25th to 29th July.

August was noteworthy for an almost complete absence of rain, abundant sunshine, and high temperatures. On only one night, that of the 7th, did the temperature fall below 50°F., and 80°F. was reached, or exceeded, on no less than 10 days, 8 of them consecutive.

The fine dry weather continued into September, and the drought was not broken until the 11th, there having been 38 consecutive days without rain. An unsettled period from 11th to 22nd September was followed by a renewal of the dry conditions which persisted with but slight interruptions until the beginning of November.

November and December were more unsettled. The traditional November fogs were in evidence during the first week, the 6th being a day of continuous dense fog, but otherwise comparatively mild and open conditions prevailed apart from slight snow and sleet on the 18th and again at the end of the month. There was also a short spell of cold weather at the end of the year.

PRESSURE

The highest pressure recorded was 30.48 inches (twice), once during the fine weather at the beginning of April, and again during the second week of December.

The lowest pressure was 28.82 inches on 29th March during the passage of an intense depression which gave over $\frac{1}{2}$ inch of rain.

THUNDER

Thunder was recorded on 12 days. The most noteworthy storms were on 27th June, when a short but severe storm gave 18.3 mm. of rain in about an hour, and on the night of 28th–29th July when there were continuous small storms throughout the hours of darkness, though not accompanied by heavy rainfall.

RAIN AND SNOW

Precipitation occurred on 151 days, the total amounting to 17.97 inches. Once again, as noted last year, this is considerably less than the totals of some other local observers, being nearly 1 inch less than at Great Barford, and 2.28 inches less than in Bedford. Staughton Manor, however, recorded nearly $\frac{3}{4}$ inch less, and the figures for Cranfield suggest that the west of the county had less than the east.

The following table summarises the monthly totals as recorded by the undermentioned observers:—

1. Mr. J. Arnold Whitchurch at Great Barford House.
2. Mr. E. H. Lock of Hurst Grove, Bedford.
3. Mr. C. S. Payne of Kempston.
4. College of Aeronautics, Cranfield (Air Ministry Daily Weather Report).
5. Staughton Manor (just outside the county boundary).
6. The writer at Bromham.

	Great Barford	Bedford	Kempston	Cranfield	Staughton	Bromham
January ...	1.50	1.15	1.17	1.19	1.36	1.10
February ...	1.58	1.49	1.63	1.17	1.36	1.51
March ...	5.10	4.92	5.09	4.2	4.79	4.48
April ...	1.80	2.16	1.99		1.62	1.38
May ...	0.59	1.21	1.11		0.84	1.11
June ...	1.67	1.82	2.00	1.48	1.23	1.82
July ...	1.76	1.98	1.59	0.93	1.76	1.70
August ...	0.02	0.12	0.11	0.04	0.0	0.0
September ...	0.98	1.04	1.01	1.20	0.97	1.07
October ...	0.28	0.24	0.22	0.18	0.23	0.18
November ...	1.43	1.57	1.37	1.25	1.35	1.38
December ...	2.12	2.55	2.44	2.33	1.73	2.24
Total ...	18.83	20.25	19.73		17.24	17.97

The heaviest fall in one day was 18.5 mm. of mixed rain, sleet, snow and hail on 12th March. The two-day blizzard of 4th–5th March produced 27.9 mm.

The longest spell of drought has already been noted; the longest wet period comprised the 27 days between 12th March and 8th April, on each of which there was some form of precipitation.

Thanks to the kindness of Mr. J. Arnold Whitchurch, the writer has now been able to examine the rainfall figures for Great Barford House covering the past 48 years. The average for the whole period has been found, and the percentage excess or deficiency of each year calculated. These percentages are then summed, giving cumulative percentage excesses or deficiencies, and it is then possible to obtain a clear picture of the succession of dry and wet periods.

The average for the 48 years is 21.97 inches. In 25 of those years the average has been exceeded; in 23 of them there has been a deficiency. The general trend seems to be as follows:—

A dry period for the first 13 years of the century (although 1903 and 1912 were years of excess rainfall), followed by three wet periods, separated from each other by a brief dry spell, thus:—

<i>Dry</i>	<i>Wet</i>
1900–1913	1914–1919
1920–1921	1922–1932
1933–1934	1935–1939
1940–1947	

It is noticeable that the exceptionally dry years appear to occur at intervals of 10 to 12 years. The following were all years with rain-falls below 19 inches:—

1901–2 1911 1921 1933–4 1942–3

At present we seem to be in a dry spell, 7 out of the last 10 years having been well below average, but it is still impossible to say what the next few years have in store.

NATURE RESERVES

A Report on the Situation in Bedfordshire

By JOHN G. DONY and KEITH PIERCY

In 1942, at the request of the Minister of Town and Country Planning, a national committee was appointed to draw up a list of areas which should be recommended for preservation as nature reserves. This committee was known as the Nature Reserves Investigation Committee, the country being divided into sub-committee areas, in one of which Bedfordshire was linked with Northamptonshire.

The sub-committee for these two counties held a number of meetings and in 1944 made its recommendations. These included two areas of biological interest of national importance; Flitwick Moor and the chalk hills between Harlington and Pirton, the latter being recommended also by the Hertfordshire and Buckinghamshire sub-committee. The Totternhoe Rock near Dunstable was similarly recommended as of geological interest. In addition seven areas of primary local importance were chosen which included three of our largest woods and three geological exposures. The list was completed with eight areas of secondary local importance, in which woods featured largely and which included some stretches of the Ouse and its adjoining meadows.

The sub-committee was by no means unanimous in these decisions, but many interests had to be considered. It was difficult to see how some of the suggested areas could be made into reserves and many questions of ownership and administration were involved. It was realised, however, that few, if any, of the recommendations would be adopted, since a number of areas in other counties had far greater claims to be scheduled as national nature reserves. Nevertheless, this list is useful as a basis for future discussions and as a guide to the local authorities which would have to be urged to take action if the Government were unable to do so.

The final Reports of the various committees, which were presented by the Minister in 1947, were admirable in their broad concept, but they were disappointing to naturalists in this county. The Report of the National Parks Committee—Cmd. 7121—recommended an area of the Chalk Hills, including the part suggested by the Bedfordshire and Northamptonshire sub-committee, as a Conservation Area and another Chalk Hill area, i.e., the country which lies between Dunstable Downs and Blows Downs and the county boundary to the south. This is the eastern extremity of a large conservation area which extends through the Marlborough and Berkshire Downs and then turns south east through the Hampshire Downs and continues to the South Downs.

The Report is by no means clear as to precisely how a Conservation Area will be administered, which perhaps gives us a reason for some hope. The Report of the Wild Life Conservation Special Committee—Cmd. 7122—contained no recommendations of nature reserves or geological monuments in Bedfordshire. The Chilterns in Hertfordshire and Buckinghamshire right up to the county boundary were scheduled as an area of scientific interest. Thus Bedfordshire naturalists cannot help feeling somewhat disgruntled when they observe that this area ends abruptly at the county boundary.

The present position is one to occasion some dismay. It appears that there is little to be expected from the National Parks Committee in the way of financial support for nature reserves in Bedfordshire, and that any action taken must be initiated by individual landowners, local authorities and groups of interested people such as this Society. The county is certainly fortunate in having a number of enlightened landowners, who take an interest in preserving the natural features of their estates.

What are the dangers which threaten the natural life of the county? The greatest appear to be building and industrial development, such as cement works, the cultivation and drainage of heathland and marsh, the cutting down of woods and hedgerows, and the pollution of rivers. Some of the chalk hills are being spoiled by the unchecked growth of briar and hawthorn, which can only be kept down satisfactorily by the grazing of sheep. Unless sheep are allowed to graze on these hills, they will eventually change their character and become covered with dense thickets.

Members may well wonder what they can do to assist in this difficult problem of nature conservation. Individuals can certainly help to

mould public opinion by discussing the subject of nature reserves on suitable occasions, and by informing the Society of any change of ownership, or drastic measures, such as extensive tree felling projects, of which they may have advance knowledge. The Society, in turn, can raise these questions with local authorities and in the press, and it is hoped that in this way something may be accomplished.

THE BRAMBLES OF BEDFORDSHIRE

By WILLIAM C. R. WATSON

Up to July, 1946, it was rather uncertain what species of *Rubus* were to be found in Bedfordshire. In the *Journal of Botany*, 1902, W. Moyle Rogers gave the following 19 species for Woburn and Woburn Sands.

<i>R. idaeus</i> L.	<i>R. echinatus</i> Lindl.
<i>R. Lindleianus</i> Lees.	<i>R. Lejeunei</i> W. and N.
<i>R. rhamnifolius</i> W. and N.	<i>R. pallidus</i> W. and N.
<i>R. pulcherrimus</i> Neum.	<i>R. hirtus</i> var. <i>flaccidifolius</i> (Muell.)
<i>R. rusticanus</i> Merc.	<i>R. dumetorum</i> W. and N.
<i>R. sylvaticus</i> W. and N.	<i>R. dumetorum</i> var. <i>ferox</i> Weihe.
<i>R. Salteri</i> Bab.	<i>R. corylifolius</i> Sm.
<i>R. pyramidalis</i> Kalt.	<i>R. corylifolius</i> var. <i>sublustris</i> Lees.
<i>R. leucostachys</i> Sm.	<i>R. caesius</i> L.
<i>R. radula</i> Weihe.	

To these may be added four more species which were given by Rogers in his *Handbook of British Rubi* (1900).

<i>R. Koehleri</i> ssp. <i>dasyphyllus</i> Rog.
<i>R. dumetorum</i> var. <i>diversifolius</i> (Lindl.).
<i>R. corylifolius</i> var. <i>cyclophyllus</i> Lindeb.
<i>R. Balfourianus</i> Blox.

Saunders in his *Field Flowers of Bedfordshire* (1911) added the following nine species:—

<i>R. suberectus</i> Anders.	<i>R. Bloxamii</i> Lees.
<i>R. thyrsoides</i> W. and N.	<i>R. pallidus</i> W. and N.
<i>R. pubescens</i> Weihe.	<i>R. hystrix</i> W. and N.
<i>R. macrophyllus</i> W. and N.	<i>R. Koehleri</i> W. and N.
<i>R. rudis</i> W. and N.	

Fifteen years later G. C. Druce in his *Flora of Bucks.* made a comparison, species by species, of the plants of Buckinghamshire with those of the surrounding counties and thus came to record the following species for Bedfordshire in addition to those given above:—

<i>R. fissus</i> Lindl. (<i>scissus</i> W. Wats).	<i>R. leucanthemus</i> P. J. Muell.
<i>R. plicatus</i> W. and N.	<i>R. oigocladus</i> Rogers.
<i>R. carpinifolius</i> W. and N.	<i>R. Babingtonii</i> Bell Salter.
<i>R. gratus</i> var. <i>sciaphilus</i> (Lange)	<i>R. rosaceus</i> , Weihe.
<i>R. macrophyllus</i> var. <i>macrophylloides</i> (Genev.).	<i>R. dumetorum</i> var. <i>fasciculatus</i> (P. J. Muell).

Combining these lists, and allowing for duplications, the number of *Rubi* recorded for Beds. thus mounted to 42 by the year 1926, but very few localities had been published.

In July, 1946, at Dr. J. G. Dony's invitation, I came to Luton to assist him in a hunt for brambles with a view to inclusion of the species and localities in his forthcoming Flora of the county. My visit was repeated in the summer of 1947. The commons, woods and hedges were diligently searched in the southern and central parts of the county, as far north as Woburn in the west and Cockayne Hatley in the east. The woods on the Clay-with-flints lying over the Chalk proved to be productive ground, especially the levels above 400 feet O.D. Where, however, the Chalk comes to the surface and grassland and arable prevail there was everywhere a dearth of brambles; and it was hardly any better on the Gault Clay. The Lower Greensand was found more productive, especially in the west and the centre of the county; but in the east between Sandy and the Cambridgeshire boundary even the uncultivated sandy soil was relatively unproductive. Of the part of the county lying to the north of the limits mentioned very little is yet known; but a beginning has been made by Dr. Dony, and as where original forest and heath remains brambles can hardly be absent, it is probable that there are some additional species awaiting discovery.

Many of the species recorded by Rogers and Druce were found again, but not all—nor was it expected that all would be found, as their lists included some very doubtful entries. The names *fissus*, *rhamnifolius*, *silvaticus*, *Salteri*, *macrophyllus*, *macrophylloides*, *leucanthemus*, *Babingtonii*, *Lejeunei*, *pallidus*, *rosaceus*, *hystrix* and *Koehlerii* were in the past in this country all used either in a very loose or in a consistently incorrect application, the correct use being unknown to British botanists. Thus, *R. leucanthemus* P. J. Muell is nothing else than the common light pink flowered *R. vestitus* Weihe, which so often passed as the very different *R. leucostachys* in Smith; whilst the true *R. Koehlerii* has never been found in Great Britain. Former records must therefore in large measure remain uncertain until the relative specimens can be produced; and the following list accordingly includes only those species that Dr. Dony and I, or one of us, actually saw growing in, and collected in Bedfordshire in 1946 and 1947. A specimen of each bramble has been placed in the Luton Museum.

The names used are those that appear, with references to figures and descriptions, in the *List of British Rubi* published in the *Journal of Ecology*, 1946, pp. 337–344. The species to which a dagger(†) is prefixed in the list that follows are additions to the *Journal of Ecology* List, which as there explained was in some respects abridged. *R. Libertianus* had been found before in Great Britain, but had not been identified: *R. luteistylus* had not been found before in Great Britain.

*New or apparently new county records.

R. idaeus L. Raspberry. Frequent.

R. caesius L. Dewberry. Frequent.

**R. caesius* var. *arvalis* Reich. King's Wood, Heath and Reach (1946), etc.

R. nessensis W. Hall; King's Wood (1946).

- R. scissus* W. Wats; Heath and Reach (1947).
R. plicatus W. and N.; Heath and Reach (1946).
 **R. sulcatus* Vest ex Tratt.; Heath and Reach (1946).
 **R. fissus* Lindl.; Aspley Wood (1946).
R. carpinifolius W. and N.; Flitwick Moor (1946); Cooper's Hill, Ampthill (1946).
 **R. mercicus* Bagn; Aspley Wood (1947).
 **R. nemoralis* P. J. Muell.; Clophill (1947).
 **R. gratus* Focke; Aspley Heath v.c. 24 [Beds.] (1946).
R. Lindleianus Ed. Lees; Frequent.
R. macrophyllus W. and N.; King's Wood (1946); Hostler's Wood, Hyde (1947).
 **R. subinermoides* Druce ex Wats.; Whipsnade Common (1946); Studham (1946).
 **R. amplificatus* Ed. Lees; King's Wood (1946), etc.
 †**R. Libertianus* Weihe; Heath and Reach (1946); Woburn (1947).
R. pyramidalis Kalt.; Aspley Wood (1946), etc.
 †**R. Schlechtendalii* Weihe; Deadmansea Wood, Whipsnade (1946); Heath and Reach (1947).
R. egregius Focke; Clophill (1947).
 **R. cryptadenes* Sud.; Spittlesea Wood, Luton (1947).
R. polyanthemus Lindeb.; Heath and Reach (1946), etc.
 **R. rhombifolius* Weihe; Cooper's Hill (1946).
R. cardiophyllus L. and M. Heath and Reach (1946), etc.
R. ulmifolius Schott f.; The common bramble of hedgerows.
 †**R. pubescens* Weihe; Clophill (1947).
R. falcatus Kalt.; Sandy (1946), etc.
 **R. Schmidelyanus* Sud.; King's Wood (1946), etc.
R. sciocharis (Sud.) W. Wats.; King's Wood (1946), etc.
R. vestitus W. and N.; Frequent.
 **R. leucostachys* Sm. Whipsnade Common (1946), etc.
R. criniger (E. F. Linton) Rog.; Studham Common (1946), etc.
 **R. adscitus* Genev.; Aspley Wood (1946).
 **R. rotundifolius* (Bab.) Blox.; Spittlesea Wood (1947).
 **R. mucronatoides* A. Ley; Aspley Wood (1946); Woburn (1947).
R. Radula Weihe; Frequent.
 **R. Genevierii* Bor.; Folly Wood, Caddington (1947); Hinwick, Podington (1947).
R. discerptus P. J. Muell.; Frequent.
R. rudis Weihe; Frequent.
 **R. echinatoides* (Rog.) Druce; Whipsnade Common (1946), etc.
 **R. rhenanus* P. J. Muell.; Aspley Wood (1946).
 **R. homalodontus* P. J. Muell and Wirtg.; Deadmansea Wood (1946).
 **R. foliosus* Weihe; Hostler's Wood (1946); Folly Wood (1947).
R. drymophilus M. and L.; Aspley Wood (1946), etc.
 **R. flexuosus* M. and L.; Heath and Reach (1946), etc.
 **R. acutipetalus* L. and M.; Aspley Wood (1946).
 **R. fuscus* Weihe; Kidney Wood, Hyde (1946), etc.
 **R. Menkei* Weihe; Folly Wood (1947).

- **R. insectifolius* L. and M.; Aspley Wood (1947), etc.
- **R. scaber* Weihe; King's Wood (1946), etc.
- **R. microdontus* M. and L.; Kidney Wood (1946).
- **R. botryeros* (Focke ex Rog.) Focke; Whipsnade Common (1946), etc.
- †**R. luteistylus* Sud.; Aspley Wood (1946).
- **R. entomodontos* P. J. Muell.; Kidney Wood (1946).
- **R. rufescens* L. and M.; King's Wood (1946), etc.
- **R. heterobelus* Sud.; Kidney Wood (1946), etc.
- **R. melanoxylon* M. and W.; Heath and Reach (1946); Kidney Wood (1946).
- **R. furvicolor* Focke; Spittlesea Wood (1947).
- **R. angusticuspis* Sud.; Spittlesea Wood (1947).
- **R. Leightoni* Ed. Lees ex Leight.; Cooper's Hill (1946).
- R. dasyphyllus* Rog.; Heath and Reach (1946), etc.
- **R. apricus* var. *sparsipilus* W. Wats.; King's Wood (1946), etc.
- **R. fusco-ater* Weihe, Kidney Wood (1946).
- **R. adenolobus* W. Wats.; Wymington Scrub (1946).
- **R. absconditus* L. and M.; Spittlesea Wood (1947).
- R. Balfourianus* Blox. ex Bab.; Cockayne Hatley (1946).
- **R. Warrenii* Sud.; Northill (1946), etc.
- R. sublustris* Ed. Lees; Frequent.
- R. conjungens* (Bab.) W. Wats.; Frequent.
- **R. tuberculatus* Bab.; King's Wood (1946), etc.
- **R. britannicus* Rog.; Leighton Buzzard (1946).
- **R. scabrosus* P. J. Muell.; Hostler's Wood (1947).
- R. myriacanthus* Focke; Folly Wood (1947).

Some of the foregoing species are of unusual interest. *R. Libertianus* is found in several stations in Belgium, but nowhere else on the Continent. In this country I found it in 1936 at Boars Hill, Berks., and now again with Dr. Dony, at Heath and Reach, and in two spots between Heath and Reach and Woburn. *R. luteistylus* was found in Aspley Wood and extends to, or from, Portugal, like *R. Genevierii*, which was found at Caddington, Beds. *R. mercicus*, which at the time Rogers' *Handbook* was written was known only in Warwickshire, was found in Aspley Wood, Beds., linking the original station with its Kentish stations at Hayes and Tunbridge Wells. This is the most local of the endemic species in the list. *R. rhenanus*, a local species in France and Germany, is distributed in Aspley Wood: it has only one other known station in Great Britain, viz: Putney Heath, Surrey. *R. furvicolor* near Luton, which was its most southerly known station at the time of its discovery: it has since been identified in Sussex. *R. Schlechtendalii*, at Heath and Reach and Deadmansea Wood, is not known to me to have been found in any other place in Great Britain or Ireland. *R. sulcatus*, at Heath and Reach, is very rare in Great Britain, though widespread from Kent to Somerset, Radnor and the Hebrides.

On the other hand there are several noteworthy absentees, common elsewhere, that one would have expected to find in Bedfordshire—*R. Sprengelii* Weihe, *R. euryanthemus* W. Wats., *R. phaeocarpus*

W. Wats., *R. rosaceus* Weihe, *R. Murrayi* Sudre, *R. raduliformis* (A. Ley) W. Wats., and *R. Babingtonianus* W. Wats. may be instanced. Perhaps they will yet be found in the county.

FURTHER NOTES ON BEDFORDSHIRE MOLLUSCA

By BERNARD VERDCOURT

In addition to an account of the work carried out in 1947, this article contains some further historical details which have come to light. The author is indebted to A. S. Kennard for this information.

C. S. B. Cox, who resided at Ampthill during 1901, drew up a MS. list of local Mollusca which B. B. Woodward used when he was compiling the list for the Victoria County History. It is a great pity that he left out the majority of Cox's localities. They are, however, given in the present paper and are marked with the initials C.B.C. Mr. Kennard assures me that Cox "knew his shells" and that his records may be accepted without question.

Mr. Kennard has also supplied a list of subfossil shells from Pegsdon deposits. These deposits are most probably Early Bronze Age and date from about 1800 B.C. This list is given in its entirety at the end of the present paper, since it is very interesting to compare it with the molluscs still living in this part of the county. It includes *Ena montana* (Drap), a species which has not been found in the county alive. This is a rare species, but occurs in Buckinghamshire in one beech wood, and is quite common in parts of Gloucestershire in the same kind of habitat.

Turning to the writer's work in 1947, four species have been added to the county list and additional localities for some of the others discovered. The River Ivel has been investigated for the first time and these records are noted for the less common species. Much useful work remains to be done in this area, though the fauna will probably be found to resemble greatly that of the Ouse. The intensely cold winter caused snails to remain late in hibernation and very few were active until the middle of March; while the very hot summer has rendered them less conspicuous than usual, since they have kept deep down in the herbage. The order and nomenclature used in the list that follows is the same as that used last year.

Pomatias elegans (Müll). Living specimens of this were found to be common at the "open" end of the "Valley Beech Wood" on Markham Hills, the density being 1-3 per square yard (September 1947). It does not seem to occur in the "closed" end. The species was feeding on fallen beech leaves.

Bithynia leachii (Shepp). Ivel Canal at Broom. (Abbreviated to I.C. in the rest of this report.)

Valvata piscinalis (Müll). I.C., in a small stream between the River Ousel and the canal at Leighton Buzzard (dead shells).

V. cristata (Müll.) I.C.

Carychium minimum (Müll). This species was found to occur frequently on leaves and sticks often quite below the water at Ampthill Marsh on 15th June, 1947. This marsh is the one at the base of Cooper's Hill near the L.M.S. station. First county record for the species *sensu stricto*.

C. tridentatum (Risso). Common in beech woods above Totternhoe village; frequent on mossy logs in Hipsey Spinney, Fancott. Scarce in rotten stumps in Great Hayes Wood. It occurs with the preceding species at Ampthill Marsh.

Limnaea truncatula (Müll). Common on mud "flats" by stream, "Hummocky Field", Totternhoe. Generally distributed in marshy places in Great Hayes Wood.

Ancylastrum fluviatile (Müll). The writer has not found this in any other place save his original locality which may be cited more exactly—small stream between River Ouzel and canal at Leighton Buzzard. It probably occurs in parts of the River Ouse on the stones at the bottom.

Aplecta hypnorum (L.). Further details of this were reported (Verdcourt 2).

Planorbis corneus (L.). I.C.

P. planorbis (L.). I.C.

P. carinatus (Müll). Broom Mill pond. This species was recorded from Limbury by James Saunders in 1888 but no recent records for the south of the county are known.

P. spirorbis (L.) *var leucostoma* (Mill). One from the Litany, Totternhoe (R. Ouzel), 1943.

Testacella maugei (Fer). A number of dead eggs of this species were found in the Misses Oldfield's garden at Ampthill (July, 1947) and communicated to the writer by the Editor. They appear to have been parasitized, but the embryonic shell remained inside. Verified by A. E. Ellis. (A living adult found 26th June, 1948.—ED.)

Testacella scutulum (Sowerby). Some specimens collected by Dr. H. F. Barnes in the Rothsay Road area of Bedford have been verified by A. E. Ellis as belonging to this species.

Vertigo substriata (Jeffr.). The V.C.H. record is now known to be based on a locality at Ampthill due to Cox, who writes "marshes near Ampthill, one locality so far". The writer has not yet found this species, but several marshy places near Ampthill remain to be examined, though many must have disappeared during the past 50 years.

Columella edentula (Drap). The V.C.H. record for this species is also based on Cox's localities, which are Woburn Woods and Woburn Sands. Cox referred specimens from the last locality to *var. columella* V. Martens in Benz, though this is usually considered to be represented in Britain only in the fossil state (Ellis 3). J. G. Jeffreys records it from Co. Tipperary in the living state (Jeffreys 4). The writer found a juvenile of the typical form in a marshy place, Great Hayes Wood (18/5/47).

Lauria cylindracea (da Costa). Woburn. (Cox).

Pupilla muscorum (L.). This species is a common sub-fossil on all the chalk hills in the south, more especially on the escarpment, e.g., Sharpenhoe.

Variety *elongata* Clessin occurs sub-fossil at Barton.

Acanthinula aculeata (Müll). Cox records this species from Woburn, Ampthill, Barton and near Bedford.

Caeciloides acicula (Müll). A few specimens of this blind subterranean species were found by digging on the slope facing Sharpenhoe Clappers. Dunstable Downs is the only other recorded locality, but it may be distributed all over the chalk hills.

Azece goodalli (Fér). Bedford, Ampthill and Barton (C.B.C.). Sub-fossil specimens are found on Boggy Bank, Fancott.

Ena obscura (Müll). Ampthill (C.B.C.). Dead shells in the rejectamenta of the Ivel canal at Broom.

Arion circumscriptus Johnston. Frequent in Hipsey Spinney and Woodcock Wood, Fancott, amongst ground debris; Great Hayes Wood.

Cochlodina laminata (Mont). Rare in Totternhoe Beech Wood. Frequent on logs and stumps in the cleared portion of Hipsey Spinney. Two adults and two juveniles in rotting birch stumps, Great Hayes Wood (18/5/47). This is the first record for the species north of Bedford, though it will probably be found to occur in many of the oak woods. Line seven from the bottom of page 19 of last year's report should read—Long Wood, Studham, very young juveniles under log bark (2/11/46); Leete Wood, Barton, adults on Elder trees, juveniles under bark (27/10/46).

Helicella itala (L.). Cox records it from Ampthill and Bedford. It is quite definitely scarce off of the chalk.

H. heripensis (Mabille). Sandy pit north of Ampthill in wood at 485,584 on sheet 84 of the old edition ordnance survey.

Ashfordia granulata (Alder). Near Pavenham and Ampthill (C.B.C.).

Arianta arbustorum (L.). This species is very widely but locally distributed in the county. It is particularly common in meadows containing streams since it prefers damp places and may often be found almost in the water. Common at Totternhoe on the Litany and extends on to the hills, though it is almost absent from the southern part of the county (Lea and Colne districts). Common at the bottom of Dunstable Downs, Doolittle Mill and Well Head. James Saunders records it from Dunstable Downs; it would appear to spread up the chalk escarpment but to become rare on the plateau. Common in the Leighton Buzzard area; Bedford (J. E. Cooper); Pavenham (C.B.C.). Common in meadows at Fancott. Sharpenhoe (B. R. Laurence). Cam area, meadows near Wrestlingworth. Stevington Holy Well. Young specimens are frequently found under bark of logs, etc., during January to March. It gains about third adult size by April. It is common in Holocene deposits in Fancott Meadows.

Trichia hispida (L.). var. *albida* Jeffreys. Woburn Sands. Cox also records var. *conica* Jeffreys from Bedford. This variety belongs to the *liberta* Westerlund complex, members of which are common at Bedford.

Cepaea hortensis (Müll). var. *fuscilabris* Kreglinger.

C. hortensis is usually distinguished from *C. nemoralis* L. by the possession of a white peristome. This present variety of *C. hortensis*

possesses, however, a brown peristome and closely resembles *C. nemoralis*. It is, however, smaller than the latter and can readily be separated by the shape of its dart. One specimen of the variety was found in Woodcock Wood—a pale rose colour and band formula 12345. A further yellow specimen with band formula approaching (12345), was found in Hipsey Spinney. The variety has also been found at Flitwick Marsh. The writer assisted by K. E. Bicknell and H. W. Rooms carried out a survey of four square yards of the marsh where the dominant plants were nettle and meadowsweet; 75 *C. hortensis* were collected, of which 44 were juveniles, whilst the remaining adults were of the following varieties:—

Nine *libellula* 00000, three *libellula* with four bands, 11 typical, i.e., *libellula* 12345, five *libellula* more or less (12345), and three *fuscilabris* red and unbanded.

Helix aspersa (Müll.). This species, which is usually quite uncommon outside of gardens, is abundant in quarries at Totternhoe. It is quite scarce on the greensand.

Helix pomatia L. Numerous specimens found near Luton by B. J. Phillips and later by the writer in the same locality. The precise locality is on the railway embankments near the Someries Castle arch, where the L.M.S. and L.N.E. lines nearly touch. The snail occurs on the embankment itself amongst clinker and clematis, as well as in the beech copses nearby (May 1948). A recently dead shell has been found at Barton Cutting (Mark Crummie, 21/6/47).

Euconulus fulvus (Müll.). In rotten birch stumps, Great Hayes Wood. Juveniles at Ampthill Marsh (15/6/47).

Zonitoides nitidus (Müll.). Marshes round Ampthill (C.B.C.).

Retinella pura (Alder). "Round Ampthill" (C.B.C.). Ampthill Marsh.

Agriolimax laevis (Müll.). The first county specimen of this species was taken on marshy ground in Great Hayes Wood (18/5/47). It was kindly examined by Mr. Hugh Watson.

Pisidium cinereum (Alder). "Boggy Bank", Fancott (B. R. Laurence).

P. personatum Malm. As last.

Sphaerium lacustre (Müll.). Extremely common amongst algae in Long Lane Pit, Tingleth (19/10/47). This pond increased enormously during the spring, and the hot summer has not reduced it.

A list of shells from the Bronze Age deposit at Pegsdon follows:—

Species	Number Found	Present Distribution in Area
<i>Pomatias elegans</i> (Müll)	84	Rare alive
<i>Carychium tridentatum</i> (Risso)	20	Occurs
<i>Pupilla muscorum</i> (L.)	70	Frequent
<i>Vertigo pygmaea</i> (Drap)	2	Scarce
<i>Columella edentula</i> (Drap)	1	Not detected
<i>Vallonia costata</i> (Müll)	20	Frequent
<i>Vallonia excentrica</i> (Sterki)	60	Frequent
<i>Acanthinula aculeata</i> (Müll)	7	Rare
<i>Cochlicopa lubrica</i> (Müll)	20	Common
<i>Azeca goodalli</i> (Fer.)	2	Rare
<i>Ena montana</i> (Drap)	4	Not detected
<i>Punctum pygmaeum</i> (Drap)	2	Occurs
<i>Discus rotundatus</i> (Müll)	28	Abundant

Species	Number Found	Present Distribution in Area
<i>Arion</i> sp.	Abundant	Abundant
<i>Clausilia rugosa</i> (Drap)	24	Frequent
<i>Cochlodina laminata</i> (Mont)	3	Frequent on escarpment
<i>Helicella itala</i> (L.)	8	Common
<i>Trichia liberta</i> (West)	14	<i>T. hispida</i> (L.) and vars. frequent
<i>Arianta arbustorum</i> (L.)	3	Not detected
<i>Cepaea nemoralis</i> (L.)	5	Frequent
<i>Retinella nitidula</i> (Drap)	5	Frequent
<i>Retinella pura</i> (Alder)	2	Not detected
<i>Vitrea crystallina</i> (Müll)	2	Common
<i>Vitrina pellucida</i> (Müll)	1	Frequent
<i>Milax</i> and <i>Limax</i>	Occur	Occur

Monacha cantiana (Mont), now so common, is noticeably absent from the list, as is also *Trichia striolata* (Pfr.). *Helicigona lapicida* (L.) is absent from the list, so perhaps our beech woods were never characterised by it. *Helicella caperata* (Mont.), *H. virgata* (da Costa), *H. heripensis* (Mabille), *Ena obscura* (Drap), *Cepaea hortensis* (Müll) and *Helix aspersa* (Müll) all occur now in the area, but are absent from this list. It is unwise, however, to make detailed comparisons.

This paper ends with a brief note on the writer's county collection of Molluscs. It now numbers many thousands of specimens, including material preserved for anatomical work and comparison material from other parts of the country. It is kept at the Luton Museum and is available for student use.

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BEDFORDSHIRE HARVESTMEN

By B. R. LAURENCE AND B. VERDCOURT

Harvestmen (Order *Opiliones*) belong to the *Arachnida*, the same class as the spiders, and are frequently confused with them. Unlike spiders, however, there is no clear differentiation into cephalothorax and abdomen, and the eyes are on a turret. Eleven of the 20 recorded British species have been found in the county by the writers, who are unaware of any previous records. A complete list follows and the nomenclature is that of T. H. Savory in (1944) *Linnean Synopses of the British Fauna* No. 1. There are no popular English names for any of the species.

Nemastoma lugubre (Müll). Amongst fallen beech leaves in Deadmansey Wood (13/1/46), (28/3/43). Ditto, Sharpenhoe, Clappers Wood (17/7/45). Under log in sandpit, Leighton Buzzard (29/9/45). All B.V.

Liobunum rotundum (Latr.). Very common on woodland herbage, *Rubi* and tree trunks. Frequently also in the open. Occurs throughout

the county. B.R.L. has found it at Fancott feeding on *Phryne* sp. (a gnat) near dung in field.

Mitopus morio (Fab.). Amongst beech leaves, Valley Beech Wood, Markham Hills (14/9/47). (B.V.)

Oligolophus tridens (Koch). Residential garden, Luton (9/9/45). (B.V.)

Oligolophus agrestis (Meade). Tingley Plantation (Pegsdon), amongst beech leaves (31/8/47). (B.V.)

Odiellus palpinalis (Herbst). Hipsey Spinney, Fancott (1945) (B.R.L.); Warden Old Wood (27/7/43). (B.V.)

Odiellus spinosus (Bosc.). Residential Garden, Luton (3/11/45), (4/9/45). (B.V.)

Phalangium opilio (L.). Common on herbage, and in woods, etc., B.R.L. records one feeding on the foot of a freshly killed *Helix aspersa* Müll. Luton (15/7/45).

Opilio parietinus (De Geer). Common under roof of air raid shelter, Luton (15/7/45), (B.R.L.); Leighton Buzzard (29/9/45). (B.V.)

Platybunus triangularis (Herbst). Bluebell Wood, Luton. (B.R.L.)

Megabunus diadema (Fabr.). On damp log, Woodcock Wood, Fancott (spring 1944). (B.R.L.)

Only one of the remaining nine species is unlikely to occur in the county. Neither of the writers has specifically hunted for these animals and the above records are the result of very casual collecting. Of the related orders of Arachnids, the false scorpion *Chthonius ischnochelus* has been found in Long Wood, Studham, amongst beech leaves (15/12/45). (B.V.)

BEDFORDSHIRE DRAGONFLIES

By RAY PALMER

Dragonflies are undoubtedly some of the most attractive of British insects; their striking appearance, remarkable structure, spectacular transformation, and fascinating habits in both aquatic and aerial stages make them of particular interest to naturalists; while the small number of species is an inducement to their study by amateur entomologists.

It is only very recently, however, that any collecting of Odonata seems to have taken place in this county, and there is a remarkable absence of Bedfordshire records in the few textbooks on the order. Lucas¹, in his famous work, does not give any records from Bedfordshire except one which he quotes from W. H. Bath², who in 1890 produced the first handbook on British dragonflies ever published; strangely enough Bath's record is of a rare species no longer known in the county, and he records no other species from Bedfordshire.

When Lucas's work of 1900, with its magnificent coloured plates, became scarce and difficult to obtain, the lack of a readily available textbook was undoubtedly a hindrance to the study of this group of insects. The appearance of Miss Longfield's work in 1937³ was therefore particularly welcome, and has certainly greatly stimulated the study of British dragonflies; though the county of Bedford is very rarely

mentioned in the distribution paragraphs of the first edition, this of course, merely indicating the absence of odonatists in the county.

Miss Longfield has kindly sent me details of the Bedfordshire records obtained while preparing the second edition of her book, and these have been of great value in preparing this paper. I have also received records direct from B. B. West and D. W. Snow of Bedford and from B. Verdcourt of Luton, and these are referred to by initials in the text.

The nomenclature is from Kloet and Hincks *Check List of British Insects*, 1945, which with one exception is the same as that used by Miss Longfield.

Cordulegaster boltonii Don. (= *C. annulatus*, Latr.). — The Golden-ringed Dragonfly is one of the largest British species, and being something of a wanderer, has a habit of turning up sporadically in a locality where it is not usually met with and then not being seen again for a long time. The only Bedfordshire record I am aware of is from West Wood, Knotting, on 6th July, 1947, when a specimen was seen at close quarters at rest by the Hon. Secretary and several other members during a field meeting of the Society. Although this species has a wide range all over Great Britain, it does not appear to have been recorded from any of the counties adjoining Bedfordshire.

Aeschna cyanea Müller.—This is the commonest large dragonfly in the county and generally distributed, frequently being found a long distance from water.

Aeschna juncea Linn.—Although called by Miss Longfield the "Common Aeschna", I have never anywhere found the species so abundant as *A. cyanea*, and have not yet taken it in the county. The Bedfordshire records are Stevington, 1942 (B.B.W.), Kempston, 1943 (D.W.S.), Ouse, 1944 (B.B.W.).

Aeschna mixta Latr.—This species, smaller and darker than the last two, is by no means common, though seems to be more abundant than *A. juncea*. I have taken it on Flitwick Moor (September, 1947), and seen several others there. A specimen was taken during the Society's field meeting at Cockayne Hatley on 3rd August, 1947. It is also recorded from Stevington, October, 1942, and September and October, 1945. (B.B.W.)

Aeschna grandis Linn. Fairly common, though less generally distributed than *A. cyanea*. It seems to be most abundant along the Ouse, though also found in wooded country away from water. It was observed during the Society's field meetings at Woburn Park on 12th July, 1947, and at Cockayne Hatley on 3rd August, 1947. Other records are:—Along the Ouse, Bromham, Kempston, Roxton, Turvey (D.W.S.). Biddenham, Bromham, Oakley, Stevington, Turvey (B.B.W.).

Anax imperator Leach.—The Emperor Dragonfly, the largest British species, appears to be scarce in the county; but being very difficult to capture, and easily mistaken for a large *Aeschna* when seen at a distance, it is possibly overlooked. There appear to be no records of specimens captured. "Seen only" 1941–43 (B.B.W.). Throughout June, 1947, I many times saw a male on Flitwick Moor, watching it through binoculars, but never succeeded in getting near it with a net.

On 29th June, 1947, I watched a pair for a long time over the lake adjoining Bakers Wood, Heath and Reach, and only just missed securing them both in the act of pairing.

Libellula quadrimaculata Linn. A migratory species and a great wanderer. It seems to be rare in the county and may possibly be only a casual visitor. Miss Longfield writes: "Strangely I only have one recent record from the county, River Ouse—'wings only'. (B. B. West.)" Presumably the insect had been eaten by a bird and the wings discarded. I saw a specimen at close quarters on Flitwick Moor on 8th June, 1947, and another near Biggleswade on 21st May, 1948.

Libellula depressa Linn.—The Broad-bodied Dragonfly is one of the commonest and best known species, and probably the most abundant large dragonfly in the county. It appears quite early in the season and is frequently to be seen around small farm ponds and ditches where other species are absent. It is common at the peat bogs at Flitwick Moor.

Libellula fulva Müller.—There is an old record of this rare insect being taken near Bedford many years ago, but unfortunately no details are available. The authority is W. Harcourt Bath, and his record is quoted both by Lucas and by Miss Longfield in their respective works. Miss Longfield in her book merely states:—"It has been recorded once in Bedford", and in response to my enquiry writes as follows:—

"Quoted from Harcourt Bath, who says it was taken 'at Newnham in Bedfordshire'. His book was published in 1890, but he gives no other data. He obviously was quite satisfied that this was a correct determination, because in the next line he queries another record as he had not seen the specimen himself. The Ouse near Bedford is quite possible, as for years the species was found regularly on the river near Huntingdon, between the years 1909 and 1913; so if it was on the river before 1890, it could have strayed south along it. Whittlesea Mere seems to have been its headquarters in those parts."

Sympetrum striolatum Charp.—This is a very common and widespread species, being found in all types of localities. It is very abundant on Flitwick Moor, and on one occasion I found a specimen that had been caught by the larva of the green tiger beetle, which had succeeded in dragging one hind wing right down its burrow, so that the dragonfly was held to the ground on its side in a helpless condition. It has a very long season, sometimes being found right into November.

Sympetrum sanguinem Müller.—Apparently rare, but may be overlooked if mixed with the foregoing species. Records are one male at Melchbourne Park lake, August, 1944 (B.B.W.), and seen by Miss Longfield; also Turvey, 1947 (D.W.S.).

Sympetrum scoticum Don. (= *S. danae* Sulz.).—Two specimens taken at Bromham Park, 1943 (B.B.W.). One of these was seen by Miss Longfield.

Agrion splendens Harris (= *Calopteryx splendens*).—The Banded Demoiselle is well known as one of the most beautiful British dragonflies. It is confined to running water, and is common along the rivers and their main tributaries throughout the county.

Lestes sponsa Hans.—Apparently rare, as it is a very distinctive species and not likely to be overlooked. I have not taken it in the county

and Miss Longfield does not mention it. The only record seems to be the following: Oakley and Great Barford, 1942, but not since. (D.W.S.)

Platycnemis pennipes Pall.—Common along the Ouse where I have looked from Turvey to Goldington; often the commonest “damselfly” (D.W.S.). Common at Biddenham and Stevington (B.B.W.). Common on River Ouzel near Leighton Buzzard and on Ouse at Bedford (D.A.). River Ouzel and River Ouse near Goldington; on the Ouzel the form *lactea* and the type occur in about equal numbers, but *lactea* predominates at Goldington (B.V.).

Pyrrhosoma nymphula Sulz.—Generally distributed, but always in very small numbers (B.V.). Ravensden, very local (B.B.W.). Occurs regularly in small numbers on Flitwick Moor, also at Southill and in the Leighton Buzzard district (R.P.).

Ischnura elegans Van der Lin.—Common and widespread. All along the Ouse (D.W.S.). Abundant at Stevington and Oakley (B.B.W.). Common on Flitwick Moor (R.P.). Generally distributed, but commonest in the north; the female forms *rufescens* Steph. and *violacea* Steph. have been taken along the Ouse (B.V.).

Enallagma cyathigerum Charp.—Fairly common and sometimes abundant locally, but less so than the following species. Common on Flitwick Moor (R.P.). Great Barford and Roxton (D.W.S.). Abundant in many places in the south, generally distributed in the north (B.V.).

Coenagrion puella Linn.—Very common in most localities, frequenting both ponds and running water.

Coenagrion pulchellum Van der Lin.—Apparently rare and local, though further search may show it to be more widely distributed, as it is a species that may easily be overlooked amongst *C. puella*. The only records are one male and one female from the Ouse, both specimens having been determined by Miss Longfield. Biddenham, 1941; Stevington, 1943 (B.B.W.).

Erythomma najas Hans.—Frequent in some parts of the Ouse (B.V.). Bromham, Oakley, Stevington (B.B.W.); Willington (R.P.).

Notable omissions from the foregoing list, and species for which a careful look out should be kept, are the following:—

Brachytron pratense Müll. found in Northants, Hunts. and Cambs.

Cordulia aena Linn. recorded in Bucks., Herts., and Northants.

Orthetrum cancellatum Linn. found in Hunts., Cambs. and Herts.

Sympetrum fonscolombii Selys and *S. flaveolum* Linn. both migratory species, that may turn up anywhere.

Agrion virgo Linn. said to be common in Bucks.

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RECORDERS

D.A.	D. Ashwell	B.V.	Bernard Verdcourt
R.P.	Ray Palmer	B.B.W.	Bernard B. West
D.W.S.	D. W. Snow		

THE FISHES OF BEDFORDSHIRE

By F. G. R. SOPER

In comparison with most English counties, Bedfordshire may consider itself fortunate in its fish population. Proof of this is furnished in the annual reports of the Ouse and Cam Fishery Board, which indicate that more fishing licences are taken out annually in Bedfordshire than in any of the other ten counties that come within the Board's jurisdiction. For this, we have largely to thank the meanderings of the Ouse, which from where it enters the county at Turvey to where it leaves at Eaton Socon, seventeen miles away, provides Bedfordshire with some forty-five miles of main river, apart from tributaries, whilst there are numerous ornamental lakes and flooded sand or clay pits that hold large stocks of fish. A very large proportion of the freshwater fish on the British list appear on our county list.

Order: HYPEROARTIA

Family: *Petromyzonidae*

LAMPERN. (*Petromyzon fluviatilis* L.) Mr. A. R. Thompson in the Victoria History mentions two records of this fish, one at Luton and the other at Milton Ernest, but I have no note of any recent occurrence.

Order: ISOSPONDYLI

Family: *Salmonidae*

SALMON. (*Salmo salar* L.) The claims of the salmon to appear on the Bedfordshire List rest on three occurrences, namely, one of 6 lbs. taken from the eel traps at Cardington Mill in 1841, another weighing 10 lbs. caught at the same place in 1853, whilst a third, a 9½ lb. male, was taken in the Kempston Mill eel traps in 1880. The capture of a 10 lb. salmon by an angler in the Little Ouse in 1946 makes it clear that these fish do still occasionally attempt to ascend the Great Ouse and its tributaries, probably during floods, so further occurrences in Bedfordshire are not impossible.

BROWN TROUT. (*Salmo trutta* L.) Probably not indigenous owing to lack of suitable spawning sites, but thousands have been introduced and many attained good size. They always did well in the Ivel, but the gross pollution of that river and its side streams of recent years, has practically wiped out the stock there.

RAINBOW TROUT. (*Salmo irideus* Gibbons.) An introduced species that is still occasionally met with.

Order: HAPLOMI

Family: *Esocidae*

PIKE. (*Esox lucius* L.) Commonly found in all waters throughout the county. There are a number of well authenticated records of pike scaling over 20 lbs. being taken in the county years ago, but the tremendous increase in the number of anglers during recent years means that few pike now have a chance of reaching a weight much over 10 lbs. Probably the largest pike in the county are now to be found in Southill Lake.

Order: OSTARIOPHYSI

Family: Cyprinidae

- CARP.** (*Cyprinus carpio* L.) Essentially a still water species and thriving best in water where there is much mud and weed growth, this fish occurs in several localities, although not reaching the size it does elsewhere.
- CRUCIAN CARP.** (*Carassius carassius* L.) Smaller than the last mentioned, but found in profusion in several Bedfordshire lakes.
- BARBEL.** (*Barbus barbus* L.) A lover of strong streamy water, it is open to doubt whether this species occurs naturally in the county. Numbers have been introduced at various times in the past eighty years and specimens are occasionally taken, usually from the turbulent waters of mill pools. They are still thought to be present in the pool at Castle Mills, Goldington, whilst three barbel were picked up dead on the banks of the Ivel near Tempsford in 1947.
- GUDGEON.** (*Gobio gobio* L.) Common in all running streams and rivers, especially where there is a gravelly bottom.
- TENCH.** (*Tinca tinca* L.) Common. In some lakes it is found in large numbers, whilst the slower reaches of the river hold good stocks of this fish. River specimens of recent years have tended to be more numerous and of larger size than formerly.
- BREAM.** (*Abramis brama* L.) Years ago, the Ouse in Bedfordshire was noted for its bream and a catch of half a hundredweight in one visit to the river was not unusual. I can recall seeing large shoals of these fish near the surface of the river in the centre of Bedford on warm summer days years ago. This state of affairs ceased rather suddenly somewhere about 1915 and for the past thirty years, except for odd specimens at Harrold, Oakley and Bromham, very few have been taken until this year, when small bream have again been met with in some numbers. The cause of their absence for so long has not been satisfactorily explained.
- SILVER BREAM.** (*Blicca bjoernka* L.) Differing from the common bream in its scale formulae and by having a double row of pharyngeal teeth, as well as in other minor characteristics, this fish must have been regarded as the young of the common bream by the writer of the Victoria County History, as it is not mentioned there at all, although Pennell and other angling writers had made it clear twenty years earlier that it was a distinct species. Common on the Continent, but in England confined to the Eastern Counties, it is found in all the slower portions of the Ouse in Bedfordshire. I do not think that it is so numerous as it was thirty years ago.
- ROACH.** (*Rutilus rutilus* L.) Our commonest fish and found everywhere.
- RUDD.** (*Scardinius erythrophthamus* L.) Primarily a still water fish, it thrives in lakes, notably Melchbourne and Southill, but there are certainly fewer in the river than formerly.
- BLEAK.** (*Alburnus alburnus* L.) Common in all the deeper and slower parts of the river. G. O. Yeats writing in October, 1801, refers to the abundance of bleak at Bedford Bridge, and I know of no locality where they are more abundant today.

DACE. (*Leuciscus leuciscus* L.) Absent from still water, but common where there is a good stream. The Ivel once held the British record for a rod-caught dace, and although that river has been badly affected by pollution, the portion near Blunham and Tempsford still holds some good dace.

CHUB. (*Leuciscus cephalus* L.) Another stream loving species, but frequenting rather deeper water than dace, especially where trees and bushes overhang the river. Its numbers have declined during the past twenty-five years owing to the killing of immature fish.

MINNOW. (*Phoxinus phoxinus* L.) Found generally in all running water throughout the county.

Family: *Cobitidae*

LOACH. (*Nemachilus barbatula* L.) A small bottom-feeding fish, often overlooked and frequently confused with the gudgeon. It occurs more in the brooks and sidestreams than in the river.

Order: **APODES**

Family: *Anguillidae*

EEL. (*Anguilla anguilla* L.) Common everywhere in still or running water.

Order: **PERCOMORPHI**

Family: *Percidae*

PERCH. (*Perca fluviatilis* L.) Plentiful in all parts of the county. A perch weighing 3 lbs. 12 ozs. caught in Arlesey Lake in 1946 was adjudged the most noteworthy catch of the year in the whole Ouse and Cam Fishery District.

RUFF OR POPE. (*Acerina cernua* L.) Normally confined to the bottom of the deeper slower portions of the main river.

Order: **SCLEROPAREI**

Family: *Cottidae*

MILLER'S THUMB OR BULL-HEAD. (*Cottus gobio* L.) Frequents stony shallows, generally in the smaller streams.

Family: *Gasterosteidae*

THREE-SPINED STICKLEBACK. (*Gasterosteus aculeatus* L.)

TEN-SPINED STICKLEBACK. (*Gasterosteus pungitius* L.) Rarely met with in the main river, but common in brooks, streams and ponds all over the county.

There are other fish to be found in the county that do not appear in the foregoing list, notably goldfish, golden orfe, pike-perch, Danubian catfish and others. These have been introduced at various times, have become naturalised and have bred freely, in fact some have done extremely well. Members of the Society who visited Woburn Park last July will recall seeing really tremendous goldfish in the pond near the Abbey, whilst netting operations in other lakes in the Park in November, 1947, yielded catfish nearly 60 lbs. in weight. Whilst I have omitted such species from the list on the grounds that they are really zoological specimens, I have not carried my objections so far as Thompson did in the Victoria County History. He omitted trout, barbel and carp from the Bedfordshire List on the grounds that they were not indigenous. He may have been right regarding the two former, although some will

challenge his contentions, but to exclude the carp which was introduced at least seven centuries ago and was well known to monastic houses in mediaeval times, is as unreasonable as to exclude the pheasant and red-legged partridge from the Bird List or the brown rat from the list of mammals.

THE HARD WINTER AND ITS EFFECT ON BIRD LIFE

By HENRY A. S. KEY

The weather of early 1947 will long be remembered as some of the worst within memory, and the severe conditions generally had an adverse effect on the bird-life of Britain, and brought many uncommon species to Bedfordshire. Ponds and lakes were frozen over, and so too were all but a few short stretches of the River Ouse and its tributaries, while the ground was frozen in the more exposed places to excess of a foot in depth. In addition to all this, the cold easterly winds caused further suffering, and heavy falls of snow in January and February were the "last straw".

The majority of species experienced great difficulty in finding suitable drinking places, and in this respect some of the town dwellers fared better than their "Country Cousins", partly through the supplies put out by the bird-lovers, but chiefly because of the abundance of running water in drains and the like, in built-up areas.

The food question was even more difficult. Food scraps and other items enabled the Blue and Great Titmice, House-Sparrows, Starlings, Robins, Blackbirds and other town-frequenting species, to hold their own to a large extent, but the more truly rural species fared adversely in the open spaces. The following narrative is, I trust, a fairly accurate account of the distribution of bird-life and bird-mortality, beginning with the outset of this memorable winter.

During December, 1946, the radio and press in their weather reports gave ample indication of the hard weather conditions that were being experienced on the Continent, particularly in Russia, Germany and the Baltic States. As one of the main factors governing migration is the nature of the climatic conditions prevailing at the source of migration, it was obvious that when the great "freeze-up" in the countries mentioned began to affect the feeding grounds of certain species, and in particular wildfowl, there would be a movement westwards of these birds towards Britain where conditions are normally far less polar. Such movement does in fact take place annually, but the severe conditions experienced during the period in question greatly accelerated the rate of movement, and influenced the numbers of migrants. It became evident in the December that our county was being invaded by a greater number of wildfowl than is usual, and as the "bird-report" in the last issue of the JOURNAL shows, several flights of wild geese were seen, and the more uncommon winter visitors such as Pintail and Goldeneye began to be reported from various localities.

In January, flocks of Starlings, Fieldfares and Redwings greatly in excess of the average annual occurrence began to be noticed through-

out the countryside and hedge fruit rapidly disappeared, while from the waterways occasional Slavonian Grebes were recorded. A further flight of geese heading westwards was observed near Radwell early in the month, while Black-headed and Common Gulls became increasingly numerous along the river valleys. Lapwings, too, were now in large parties, and Snipe were commonly seen in the water-meadows. The Wildfowl had very noticeably increased in numbers, and Pochard, Tufted Duck and Wigeon were more abundant than usual. Although in most winters a number of Coot frequent the area of the Bedford sewage farm, during the period in question their numbers far exceeded the average.

With the gradual freezing up of the lakes, gravel and claypit pools, the Wildfowl became more evident on the streams, and by the middle of the month reports were received of Smew occurring on certain waters. I, personally, saw several of these birds, which were for the most part "redheads". The species occurs annually in small numbers on the large reservoirs in neighbouring counties, yet is seldom met with in the limited pools and waterways of Bedfordshire unless such climatic conditions as those under consideration, increase the numbers migrating to our country. Along these waterways still later in the month, the larger gulls appeared, and a few Herring Gulls were seen on several occasions. Goosanders also joined the other wildfowl in small numbers.

In the fields, large numbers of Golden Plover consorted with the Lapwings, and in the hedgerows were greater flocks than usual of Chaffinches, Greenfinches, Goldfinches, Linnets and Yellow Hammers.

By the end of the month the conditions had become so bad that the majority of wildfowl had departed elsewhere in search of open water and feeding grounds, and with them went the bulk of the Waders such as Snipe, Golden Plover and Lapwing. Even the muddy ditches at the Bedford sewage farm became a solid mass of ice, and the Herons which normally resort to such localities likewise left us for the same reason. An occasional Dunlin appeared and moved on.

Bird life in general became by now noticeably scarce, and most observers were prompt to remark and report on this. There was of course great activity near hay and corn ricks, where Finches, Buntings, Larks, Pipits and Pied Wagtails were seen in large numbers, even frequenting the rick-yards of farms. The more omnivorous Crows and Starlings fared best of all during this period.

In the middle of February a slight thaw did but little good, as the frozen ground beneath was too hard to permit penetration, and I witnessed several incidents where wildfowl when "pitching in" to certain pools, suffered a nasty shock from contact with the ice underlying the shallow supernatant water.

We were now in the grip of the icy conditions, and it was not surprising to receive reports of Waxwings being seen. Before the season had ended the species had been recorded from many widely separated localities. In Bedford, Luton, and a number of other towns, these birds were seen busily feeding on the berries of garden shrubs, or the trees bordering the thoroughfares.

These were not, however, the only more unusual visitors to the towns. Black-headed Gulls could be seen frequently feeding in several

of the main streets of Bedford, dodging the traffic while scavenging for food. In the City of London this is a common sight but in our County Borough it is quite a rare happening, although in most winters a few birds occasionally frequent the meadows bordering the Embankment as well as the various playing fields. Pied Wagtails, too, were rather more frequently seen than is usual about the streets and yards.

During the preceding few weeks, the snow had gradually deepened to a thick frozen carpet over the whole countryside, blotting out many of the few remaining feeding-grounds, and it was now that such birds as the Owls began to fare very badly. Several dead Barn and Tawny Owls were picked up in an emaciated condition, and in many specimens feathers at the base of the beak and on the claws had been worn away and bloodstained due to the birds scratching in the snow, in an attempt to reach the mouse-runs which were safely protected by the icy covering. A number of Green Woodpeckers were also recovered, victims of the arctic conditions to which the species is ill-accustomed.

About this time, through the courtesy of the editor, I addressed an appeal in the *Bedfordshire Times* calling for information regarding the mortality of wild birds, and asking for any unusual specimens that had been picked up to be sent in for identification, but the request met with poor response, probably due among other reasons to the strange fact that very few carcasses of birds are ever seen in the countryside. No doubt the many hungry predators rapidly removed traces of them. However, it was evident to many active bird-watchers of the Society that there had been a high mortality rate, and "absentees" were duly noted. More of this later.

At the close of the month a temporary thaw set in, and some of the wildfowl returned to the "unlocked" waterways, a few more Snipe were seen, and bird activity became more pronounced, but Lapwings, Golden Plover, Redwings and Fieldfares were conspicuous by their relative absence.

Then came the blizzard early in March, with deep snow drifts which isolated many of the villages, particularly in the North of the county. Fortunately the effects were of short duration, and the fall was followed by such a rapid thaw that the resulting floods caused great national damage to property and agriculture. Although there was a veritable sea in the river valleys and many wildfowl returned to these haunts, yet it was not easy for these birds to find sheltered water owing to the speed of the current and the danger of floating pack-ice. Consequently the number of birds fell far below what might have been expected.

It was during this period that an interesting addition was made to the county list of species. My wife and I had the good fortune positively to identify a Black-necked Grebe on the River Ouse at Bedford sewage farm, and full particulars will be found in the Bird Report. The remains of a Diver were recovered by pupils of Bedford School from the edge of the claypit pool at Kempston Hardwick. Two Kittiwakes were also seen on a partially flooded football field in Barker's Lane, Bedford. At the height of the floods, Mute Swans were to be seen swimming and walking in certain main streets of the county town.

But we had still to suffer further from the elements. During the night of 16th–17th March, 1947, a hurricane raged across the country blowing down trees in its path and causing pack-ice to drift and form obstructions. At the edge of lakes such as Southill, the water was whipped into fury, and when I visited this locality shortly afterwards the signs of the storm were very evident. Among the pile of debris which had been cast up and littered the banks were many bodies of Coot.

The following day another unusual visitor to the country was seen at Bedford in the form of a male Great Grey Shrike, while Mr. S. W. Rodell of Luton had a similar experience at Blows Down near Dunstable. The seemingly abnormal appearance of these birds with us was another indication of the severity of the wintry conditions now happily passing. I say seemingly because it is possible that had the county possessed a greater number of active watchers in the past, the records of the occurrences of this species might have been more numerous.

It was with the coming of spring that the watchers were able to take stock of the effects of the severe conditions that had been experienced during the past months. The various regional reports generally agreed on the scarcity of certain species, and although it was as yet too early accurately to assess the total deprivation some indication of the damage could be formulated.

For reasons stated, the majority of the Crows, Finches and Buntings seemed not to have fared too badly, but such species as the Tree-creeper, Goldcrest, and some of the Titmice, especially the Longtailed and Cole-Tits evidently suffered. The Blue and Great Tits because of their association with the dwellings of man probably came off best in this family. Some observers remarked on the scarcity of such birds as the Hawfinch and the Lesser Redpoll, but the habits of these species rendered the possibility of their having been overlooked.

Mistle- and Song-Thrushes were greatly depleted, and as Redwings in particular, and Fieldfares, were not very evident during the return migration, there seems no doubt that these too suffered some diminution in numbers. The Blackbird, however, and I think in some measure for the same reason suggested above for the Blue and Great Tits, came through the winter very well. As the nesting season approached, wrens too were noticeably absent. Very few Kingfishers were seen during the breeding season along our waterways, and Herons were present in fewer numbers. Of the Woodpeckers, the Green Woodpecker suffered most severely, and it became a topic of conversation when one was heard. The status of the Nuthatch was not too clear, but it was felt generally that there had been some decrease. I have already commented on the Owls, but strangely enough I did not find that the Little Owl had suffered anywhere near so badly as the other members of the family.

The distribution of the wildfowl, too, has received some consideration, but there was no evidence from the various localities in the county of any high mortality rate. What did happen to these and many other species is that they did undoubtedly migrate as did the waders, to more suitable feeding-grounds, probably further south.

The waders, however, are known to have suffered, and with the advent of the breeding season, far fewer Lapwings, Redshank and Common Snipe were seen than normally. The same remarks apply to the Heron, Great Crested Grebe, Coot, and Moorhen.

Fortunately, the weather and conditions generally during the following summer were conducive to successful breeding, and many species made a rapid recovery to about normal status in a single season. There were, however, some bad gaps in the ornithological field. The notable decrease in Barn Owls, Kingfishers, Great Crested Grebes, Wrens and Stonechats still gives rise to much concern, and it is hoped that everyone will do his or her utmost and use every influence to afford protection to these and other species during the breeding season, in order that they may recover their normal strength.

One question remains, and it may be that we shall never completely know the answer. As indicated in the foregoing, I wonder, did some of the species which obviously migrated to more suitable localities in the country, stay and rest in these regions, thereby giving a false impression of the rate of mortality? I say this, because later in the summer, after being absent during the breeding season from many haunts where they had been residents for untold years, certain species returned: these included Marsh-Tits, Wrens and Kingfishers. This is one of the instances where co-operation between the various county and other Natural History Societies will be invaluable to complete as far as possible, a true picture of the effects of a winter, the like of which we trust will never recur in a lifetime.

CHANGES IN BIRD POPULATIONS

By KEITH PIERCY

Although the changes which take place in bird populations are of considerable interest to ornithologists, there is comparatively little evidence on which estimates of fluctuations can be based. Only a few species can be counted with a fair degree of accuracy over a large area. Examples of such species are birds which nest in colonies, such as Rook and Heron, and conspicuous birds which breed in comparatively few localities, such as Great Crested Grebe. The numbers of these species are known with reasonable exactness, both for the country as a whole and for this county. The following is a brief summary of the data which is at present available.

In 1945 a Rook census, which covered a large part of Great Britain, was carried out by the simple but laborious method of counting the nests in each rookery. In Bedfordshire the number of breeding pairs was estimated as 11,300. There is no record of a previous census of this type in the county, but it is hoped that it can be repeated after a suitable interval, for example in 1950, in order to discover how the rook population is changing.

Early records of Herons in Bedfordshire are scanty. There was a heronry in Luton Hoo Park until about 1869¹ and isolated nests have been recorded in Woburn Park and Twin Woods.² There has been a heronry in Sandy since 1890 or possibly earlier. About 1916 the first colony was deserted and soon afterwards a new colony was founded

nearby. In 1928, when the census of heronries took place, there were 10 nests at Sandy. The only other heronry recorded at that time was at Ford House, near Eaton Socon, and in 1928 it contained 10 nests.³ In 1942 this heronry was deserted, but the birds appear to have moved over the river to the Huntingdonshire side where a new heronry was established.⁴ At the present time there are heronries at Bromham, Sandy and Southill and there have been isolated nests at two places on the Ouse in recent years. The total numbers of nests in the county were 2 in 1901, 20 in 1928, c.30 in 1941 and 37 in 1946. The total fell to 25 in 1947, presumably because of the severe weather in the early part of that year.

The first probable record of Great Crested Grebes breeding in the county is at Southill Park in 1892 or 1893. They were first observed nesting at Woburn in 1894.² In the 1931 census of Great Crested Grebes, the total number of birds observed in Bedfordshire during the breeding season was 36,⁵ in 1946 the figure was 22 and in 1947 it had fallen to 10, again probably because of the severe winter.

Another species which might be investigated in this way is the Sand Martin, and any information on the location of colonies and the numbers of occupied nests will be welcomed by the author. It is hoped that it will be possible to give annually the status of the Heron and Great Crested Grebe in the county, and later to describe in greater detail the fluctuations which have taken place in the numbers of these species, together with more data on the Rook population.

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THE FAT DORMOUSE AND OTHER WILD MAMMALS AT WHIPSNADE

By GEOFFREY M. VEVERS

Although introduced into this country by the late Lord Rothschild only half a century ago, the Fat Dormouse, "Seven Sleeper" or Squirrel-tailed Dormouse (*Glis glis*) has increased in numbers and range to such an extent that it is now regarded as a British mammal.

Since 1931 no less than 33 living specimens have been caught in the lofts of my wooden bungalow at Whipsnade, thus establishing its presence in Bedfordshire. All these specimens were taken in Brailsford traps baited with apple, and most of the captures were in early autumn, for apparently these little creatures like to hibernate in barns and dwelling houses if they can obtain easy access. They make their presence known by much scuffling at night and a curious coughing bark when they are annoyed.

Lord Rothschild originally released them at Tring, but they seem to have spread in all directions and there are records of them from Amersham, Aylesbury and other points within a radius of 12 to 15

miles from Tring. As the crow flies, Whipsnade is about seven miles from Tring, where this mammal is known locally as the "Chinchilla" or "Spanish Rat".

They are reputed to hibernate for seven months, hence the name "Seven Sleeper". When hibernation is over, in April or May, they leave their winter nest and go out into the woods and hedgerows, where they feed on vegetable matter and, later on, fruit and nuts. They are very partial to apples and I have known a whole fruit to disappear from the dining room sideboard during the night. On one occasion, one was accidentally shut in the sideboard drawer but gnawed its way out.

The natural home of *Glis glis* is Southern and Eastern Europe, extending from Spain, Greece and Italy through South Germany and Austria to Syria and the south of Russia. The body of the "Seven Sleeper" is more than twice as large as that of our own Dormouse and it has a long bushy tail with the hairs arranged in two rows, which, when spread out, gives it the appearance of a miniature Squirrel—in fact it is often mistaken for a young Grey Squirrel as it is similar in general colour and shape. It hunts by night and sleeps during the day. The young, which are sometimes born in deserted birds' nests, vary from three to six in number. They are blind and naked at birth but quickly come to maturity.

Glis glis must now be quite common, but apart from those found in my bungalow, I have only seen one specimen in my garden. This was at dusk one evening last September, and it was sitting in a beech tree eating a nut, rather like a Squirrel.

Most of the specimens I have caught have been sent to the London Zoo, where they live quite well in captivity. They make interesting pets but are liable to bite, and if kept together fight ferociously between themselves.

Other mammals found in my garden at Whipsnade (apart from *Mus musculus* and *Rattus norvegicus*) and brought in quite regularly by our cat are:

Bank or Long-tailed Vole (*Clethrionomys glareolus*).

Short-tailed Vole (*Microtus agrestis*).

Long-tailed Field Mouse (*Apodemus sylvaticus*).

De Winton's Mouse (*Apodemus flavicollis wintoni*).

Common Shrew (*Sorex araneus*).

Pygmy Shrew (*Sorex minutus*).

The Pygmy Shrew is much more common than is generally supposed. During the past year our cat has brought in quite a dozen specimens, mostly between May and the end of September. Although Shrews do not hibernate, they are not so much in evidence during the winter months. *Sorex minutus*, the smallest of all British mammals, can easily be recognised by the tail, which is relatively longer in proportion to the body. The tail is also more hairy than in *Sorex araneus*. The skull is proportionately narrower and longer than that of the Common Shrew, and there are several differences in the dentition of the two species.

Other mammals recorded at Whipsnade include:—

European Hedgehog (*Erinaceus europaeus*).

Fox (*Vulpes vulpes*).

Stoat (*Mustela erminea*).
 Weasel (*Mustela nivalis*).
 European Badger (*Meles meles*).
 European Squirrel (*Sciurus vulgaris*).
 Grey Squirrel (*Sciurus carolinensis*).
 Dormouse (*Muscardinus avellanarius*).
 European Hare (*Lepus europaeus*).
 Rabbit (*Oryctolagus cuniculus*).

The various species of Bats at Whipsnade have not yet been recorded and there is no record of the *Harvest Mouse (*Micromys minutus*) or the Black Rat (*Rattus rattus*) ever having been seen.

*(Since writing the above I have had good evidence of the Harvest Mouse being seen at Whipsnade.—G.M.V.)

REPORTS OF RECORDERS FOR 1947

BOTANY

This was an unusual year. The season started late but soon developed into a summer never to be forgotten for its opportunities for botanising. The most interesting discovery of the year was E. Milne-Redhead's *Cerastium brachypetalum* Pers. (see *Abstracts from Literature*). Two new natives were found, a Lady's Mantle (*Alchemilla xanthochlora* Rothm.), by the Recorder in company with Peter Taylor at Luton Hoo, and a Sedge (*Carex polyphylla* Kar. and Kir.), by the Recorder at Whipsnade. Twenty new aliens to the county were found and a number of new brambles (see Mr. Watson's separate account). The most useful work in recording was, however, the extension of the known distribution in the county of 150 species. A number of well known botanists, including V. S. Summerhayes, J. E. Lousley, R. L. C. Burges and F. Rose, found time to visit the county.

A useful beginning was made of an ecological survey of Flitwick Moor. A preliminary study was made of about a half of the Moor and it is hoped to complete this stage of the survey in 1948.

J. G. DONY.

ORTHOPTERA.

The Orthoptera is a particularly interesting and varied order of insects, in which there is scope for much useful work to be done. Our Bedfordshire records are scanty, and there is very little information as to the distribution and relative frequency of the various species.

Including the Earwigs (now treated as a separate Order) there are 47 species on the British list, including several naturalised aliens; while foreign cockroaches and grasshoppers are frequently imported with fruit, particularly bananas.

There are 16 species at present on the Bedfordshire list; these consist of one earwig, one cockroach, eight short-horn grasshoppers, five bush-cricket, and one cricket.

The little earwig (*Labia minor*)—not at present recorded for Bedfordshire—should be looked for, as it is almost certain to occur. Certain foreign cockroaches—particularly the American cockroach—are well established in most towns, although we have no local record as yet, while green cockroaches from Jamaica are often found among bananas. Any records of such introduced insects would be of interest.

Information is also required about the distribution and relative abundance of the various grasshoppers and bush-crickets already recorded, while several further species may still be found.

RAY PALMER.

NEUROPTERA AND EPHEMEROPTERA

One species of lacewing fly has been added to the county list, namely, *Chrysopa vittata* Wesmael. Two were found on an oak trunk in Woodcock Wood, Fancott, 27.7.47 (B.V. and B.R.L.). One species of mayfly (*Ephemeroptera*) may also be added. A specimen of *Ephemera danica* (Müll.) was caught in a shop at Greenfield (21.6.47) (B.V.). A complete list of Bedfordshire Hemiptera will be published elsewhere, owing to lack of space in this JOURNAL.

B. VERDCOURT.

HYMENOPTERA

HYMENOPTERA ACULEATA. During the year two species have been added to the county list of wasps. Two females of the Crabronine wasp *Corynopus coarctatus* (Scop.) were taken on 13th July and 9th September on the regenerated vegetation of the old peat workings on Flitwick Moor (field 309 of the 25 inch O.S. map), blackberry stems being the most probable of the several known nesting sites of this wasp, although the old stems of *Typha* are another possibility as the species has been taken in other fenland localities. A single female of *Anteon brachycerum* (Dalman) was swept from birch in the same locus on 25th May. This is a representative of the Dryinidae, a family which has hardly been worked in the county as only seven of about forty known British species have hitherto been found. These curious and usually very small insects are internal parasites of "frog-hoppers" and little is known of their biology. They are all rare and seldom taken, usually by sweeping trees.

New localities have been found for several of the rarer species previously taken (but not yet published) in only one or two localities. Among the solitary bees, the beautiful blue-black and grey *Andrena cineraria* (L.), previously only known from Whipsnade, was taken at Baker's Wood, Heath and Reach; while another Whipsnade species, *A. fulvago* (Christ), a bee usually found upon yellow Compositae, was taken at Great Hayes Wood on *Taraxacum* and at Radwell, Felmersham on *Hieracium pilosella* L. *Andrena tibialis* (K.) was taken at Leighton Buzzard and the inquiline bee *Nomada signata* Jurine at Baker's Wood. A single female of the Crabronine wasp *Coelocrabro capitosus* (Shuck.), previously only known from the extreme south of the county at Deadmansea Wood, Whipsnade, was taken at Wymington Scrubs in the extreme north. Apparently, so I am told by hymenopterists, this wasp

is seldom taken on the wing, but is more readily obtained by breeding. It has a curious preference for building its nests in the pruned twigs of ash. When a young ash twig is lopped, two lateral twigs are put forth from the cut end and the wasp digs its burrows in the latter. A search for such V-shaped lopped twigs and an inspection of the cut-off parent twig will show whether the latter has been utilised for burrows. As I have found, other wasps such as *Passaloecus gracilis* (Curt.) use this specialised nesting-site. The related species *Coelocrabro cetratus* (Shuck.)—which is not rare with us—was found nesting in numbers in an alder trunk on Flitwick Moor on 13th July and preying upon an abundant black and yellow fly, a species of *Sciara*, so Mr. Laurence informs me. A female of the rather uncommon red and black sand wasp *Mimesa shuckardi* Wesm., was taken at Clophill with a Jassid bug (undetermined) as prey. Finally, Mr. Newson took examples of the red ant *Formica rufa* L. (previously only known from the pine woods at Clophill and Maulden) on the tunnel baulk, Wymington, on the Society's field meeting of 18th May.

On 20th July a brief visit was made to Galley Hill, Sutton, a hitherto unexplored lower greensand locality in the extreme east of the county. The "aculeate" fauna proved to be typically greensand with some interesting species present. A large expanse of ragwort (*Senecio jacobaea* L.) furnished the bees *Andrena denticulata* (K.), *A. bimaculata* (K.), *A. thoracica* (F.), *Colletes fodiens* (Geoff. in Fourc.) with its inquiline *Epeolus variegatus* (L.) and *Coelioxys conoidea* (Ill.), the common inquiline of the maritime leaf-cutter bee. The wasps included the typically sand-loving spider-hunting *Pompilus unguicularis* Thoms., the rare *Crossocerus palmipes* L. (as usual, on oak), the inquiline wasp *Nysson trimaculatus* (Rossi) on *Rubus*, and *Mimesa rufa* (Panz.), previously only known as a single example from Rowney Warren. In addition several of the dark variety of the male of the abundant sand wasp *Hoplocrabro quadrimaculatus* (F.) were caught.

HYMENOPTERA SYMPHYTA. A preliminary list of 183 species of sawflies taken in the county up to 1946 has been published in the *Entomologist's Monthly Magazine*, a few copies of which are available for (gratis) distribution to interested members. This list includes a species new to science, *Rhogaster chambersi* Bens., described by Mr. R. B. Benson, M.A., F.R.E.S., of the British Museum (Natural History), partly from examples taken by the writer at Clophill, Deadmansea Wood and Odell Great Wood.

The past year was again excellent for this group of rather elusive insects, continual fine weather with adequate humidity during the peak months of May and June providing ideal collecting conditions. Sixty-one species (including one by Mr. Benson and one by Mr. B. R. Laurence) have been added to the county list, which now comprises more than 50% of the British fauna, a satisfactory proportion at this early stage of the survey for a highly-farmed county, as a considerable proportion of the British species is restricted to northern regions or to plant associations poorly represented in Bedfordshire. Several species hitherto undescribed have been found and a number of rareties seldom recorded for Britain. The full list with biological and ecological details

will be published elsewhere but the following records are of particular interest. At Heath and Reach, Mr. Benson captured the tiny *Xyela julii* Brebisson—the only representative of its family in Britain—the writer taking a single example later. According to Benson's findings the larva lives in the male flowers of pine and the adults are usually taken feeding upon birch pollen. Several examples of the red and black *Dolerus bimaculatus* Geoffr.—previously considered to be restricted to Scotland and Ireland—were taken on Flitwick Moor. Another rare sawfly *Protomphytus perla* Klug was bred from larvae found abundantly at Flitwick Moor on *Populus nigra* L., a new and unexpected food-plant. Two examples of the tiny black *Messa glaucopsis* Konow were taken on aspen—in the leaves of which the larvae make mines—at King's Wood, Heath and Reach; this species is only recorded elsewhere from Hertfordshire where Benson first discovered it in Britain in 1936. A species of *Pachynematus* new to science was taken at Ampthill and examples of another new species of *Pachynematus* and one of *Amauronematus* recognised by Benson but not published at the time of writing were also taken in the county. About a dozen of the additions to the county list were made during Society field meetings. Both of the pine sawflies *Diprion pini* L. and *D. similis* Htg. were found as larvae during September on the pine plantations at Aspley Heath and Clophill.

During the year details of the biology of *Rhadinoceraea gracilicornis* (Zadd.) and of *Neurotoma mandibularis* Zadd. have been elucidated (see Report for 1946). The biology of the recently described sawfly *Rhogogaster chambersi* Benson is still unknown, but, as in the case of its apparently less abundant relative *R. picta* Klug, broom is probably one of its food-plants. On 1st June, twenty minutes sweeping of broom at Clophill in hot weather yielded twenty-one females of *R. chambersi* and five of *R. picta*; on 29th June and 5th July, six and one females respectively of *R. chambersi* only were swept from the same plants. The failure to capture males is remarkable. Sawfly larvae were also numerous on the same plants on the last two occasions; breeding of the adults—which is difficult in Tenthredinines as the naked larvae are easily killed by fungi—will determine to which species these are to be referred. There is no doubt that the larvae of *R. chambersi* have other food-plants as the adults have been taken at Deadmansea and Odell Great Woods in which localities broom has not been found and the related gorse is also either rare or absent.

V. H. CHAMBERS.

COLEOPTERA

It is perhaps too early yet to predict the full effect which the phenomenal weather of the severe winter and late spring of 1947 may have upon the insect fauna of the county for the next few years, but for many species the balance of life must have been seriously disturbed.

Insect populations probably sustain heavier casualties during a wet winter than in one which is cold and dry; last year provided both extremes. High ground, although covered by deep snow, soon returned to its normal condition, but the low-lying meadows were in some cases

waterlogged for weeks. Certain wooded areas by the riverside, e.g., those at Bromham Park, remained inaccessible until late summer, and throughout the county, vegetation suffered a noticeable check. Many species of Coleoptera were not seen at the usual time of their appearance owing to the absence of the blossom of such flowering trees as hawthorn, upon which they subsist, and throughout the season, flowers, later than usual in appearance, were almost without exception short-lived and thus one is left to conjecture to what extent the insects normally dependent upon them have suffered in consequence.

During the past year, Flitwick Moor has been visited by members of the Society on many occasions, and our list of Coleoptera from this favoured locality has been augmented by the work of Messrs. Newson and Verdcourt of Luton, and Dr. V. H. Chambers, who maintained a close watch over the area during the whole of the year. Flitwick was also visited in April by the Rev. E. J. Pearce, and in June by the Rev. C. E. Tottenham of the Entomological Department of the University Museum at Cambridge, at the invitation of the Writer, these two gentlemen being well known specialists in the Order.

In addition to the field work at Flitwick, Dr. Chambers and Mr. Verdcourt have frequently collected in the Kingswood and Heath and Reach areas near Leighton Buzzard, a district formerly worked intensively by the late Rev. Crawshay, sometime curate at Linslade, and afterwards Rector of Melchbourne. It is hoped that in due course, we shall have sufficient data to contrast the insect fauna of this district as it is today with that supported by the same locality forty or fifty years ago. Many of Mr. Crawshay's better species of Coleoptera have not been captured in late years, but it is too early yet to draw conclusions.

From a statistical point of view, the 1948 collecting season should, if the weather proves reasonable, supply data of a highly interesting and valuable nature. All field workers are reminded that negative evidence, i.e., reports of insects which have *not* been found in their accustomed habitat may be just as valuable to the Recorder as are the reports of captures. Transport difficulties may prevent many town members from reaching some of the more remote country districts, and it is therefore mentioned that intensive observations from a restricted locality near at hand generally prove to be of greater value than haphazard work done in a number of widely separated areas.

C. MACKECHNIE JARVIS.

BIRDS

As reported in a separate article the hard winter of the first part of the year had a pronounced effect on the distribution and numbers of birds. These severe weather conditions were followed by a summer of sharply contrasting warmth and drought, which enabled many species to regain wholly or partly their former status, and by a comparatively mild autumn and winter.

At the end of the nesting season it was good to hear the songs and calls of many species that had temporarily deserted us, and as the year wore on there was increasing evidence of most of these species. The

exceptions were, among others, the Great Crested Grebe, Kingfisher, Barn Owl and Stonechat, and I appeal once more to all members to discourage egg collecting among children, and to influence others to give the maximum protection to birds in general, so that the position can be restored to the pre "arctic" level.

Carrión Crows, Rooks, Jackdaws and Magpies have further increased in numbers, and a point has now been reached where it is felt landowners would be well advised to take some suitable action to lessen the number of these birds, which not only interfere with crops, but with the nesting of other species. The summer visitors were on the whole recorded as arriving rather earlier than in recent years, and the "tit-bit" was a Swallow seen at Bromham Bridge on 20th March. This is the earliest date ever recorded in the county.

The Ornithological Field Excursions were well attended both in and out of the county, and a brief summary of each is appended:—

Sunday, 27th April. Northampton Sewage Farm.—The weather was dull and showery but the 20 members present saw many interesting waders.

Thursday, 22nd May. Bedford Sewage Farm.—Sunny evening. Attended by 18 members.

Saturday, Sunday, 24th–25th May. "Evensong and Dawn Chorus of Birds", Stagsden.—The occasion was marred by showers of rain which particularly spoiled the "Dawn Chorus" for the 25 members present. The night was not, however, without its high spots as a Quail was heard, and also a Nightingale sang continuously for 8½ hours.

Sunday, 1st June. Coach trip to various localities in Norfolk including Hickling Broad.—A gloriously sunny day that was appreciated to the full by the 31 members, who included some entomologists and botanists. Marsh and Montague Harriers were seen and Bitterns were heard "booming".

Sunday, 15th June. Stretch of River Ouse between Willington and Barford. Sixteen members enjoyed the outing although the weather threatened at first to spoil the event. A Reed Warbler's nest containing a Cuckoo's egg was found, and two Common Terns were seen fishing in the pool at the locks near Willington.

Sunday, 7th September. Northampton Sewage Farm.—About 20 members were present and appreciated the fine weather. Another good day for waders.

Sunday, 12th October. Northampton Sewage Farm.—Fine day—18 members present. Again a good "wader" day including a Curlew-Sandpiper.

Sunday, 16th November. A visit by 31 members to the New Grounds, Slimbridge, Gloucestershire, to study the wild Geese and captive Waterfowl. Peter Scott acted as host.

Sunday, 30th November. Bedford Sewage Farm. — Frosty weather. The 13 members present had the good fortune to observe a Hooded Crow.

Sunday, 28th December. Ramble in the Stagsden-Turvey area.—Eleven members enjoyed a good walk in ideal weather.

There is still much room for improvement in the keeping of records, but the new record sheets should prove a valuable aid. It cannot be too keenly stressed that the keeping of good field notes makes toward a good ornithologist or "bird watcher". Members should take particular note of the dates of the first appearance and last departure of both summer and winter visitors, and should observe the distribution in their localities of even the common species. Lastly, when making notes it is desirable to record the weather conditions prevailing at the time, as these have a definite bearing on such things as migration, feeding territories, etc.

HOODED CROW (*Corvus c. cornix*)—One bird was seen at Bedford Sewage Farm on 2nd November by pupils of Bedford School. Two were observed on 7th December and these remained throughout the winter.

STARLING (*Sturnus v. vulgaris*)—A bird of unusual colouring—uniform pale cream—frequented the neighbourhood of Burdelys Manor, Stagsden, during the late summer and autumn (*D. W. Elliott*).

SISKIN (*Carduelis spinus*)—Six were seen at Clifton on 20th January by *K. Piercy*.

COMMON CROSSBILL (*Loxia c. curvirostra*)—*Overseer Bates* reported that a flock of these birds was seen at Whipsnade on 1st March. Several other occurrences, unfortunately not confirmed, were reported during the early months of the year from the Woburn-Aspley Guise area.

CONTINENTAL CHAFFINCH (*Fringilla c. coelebs*)—One male was identified among a large party of Chaffinches at Bedford Sewage Farm on 12th January by *H. A. S. Key*. A few others were subsequently seen on a number of occasions by other members, and were carefully identified.

BRAMBLING (*Fringilla montifringilla*)—A number were observed among a party of Chaffinches near Clifton by *K. Piercy* on 20th January. One female visited the President's feeding-table at Leighton Buzzard during the last week in February. Other reported occurrences were:—a small flock observed near Flitwick from 29th to 31st January (*R. Palmer*); six seen at Flitwick on 16th February (*W. G. Sharpe*) and four, also at Flitwick on 19th November (*C. M. Crisp*).

CORN-BUNTING (*Emberiza calandra*)—Found to be more widely distributed during the breeding season than was formerly supposed, showing special preference for the valley of the River Ouse and its tributaries as well as for the region of the chalk hills.

CIRL BUNTING (*Emberiza c. cirrus*)—One male was seen near the Icknield Way on 3rd June by *A. A. Collier*.

YELLOW WAGTAIL (*Motacilla flava flavissima*)—The first summer arrivals (c. 75) were seen at Bedford Sewage Farm on 22nd April by *H. A. S. Key* and party.

GREY WAGTAIL (*Motacilla c. cinerea*)—One male was observed near Shefford on 3rd March by *K. Piercy*. Other reported occurrences were:—a female at Bedford Sewage Farm on 22nd April (*F. C. Gribble*) and a male at Flitton Marsh on 25th November (*W. G. Sharpe*), in addition to several other winter records.

WHITE WAGTAIL (*Motacilla a. alba*)—At least two males were seen among a large mixed party of Wagtails at Bedford Sewage Farm on 22nd April (*H. A. S. Key*). Also reported as having occurred on migration during the summer, but there is evidence of some confusion with immature Pied Wagtails.

GREAT GREY SHRIKE (*Lanius e. excubitor*)—One seen at Blow's Down, Dunstable on 27th February (*S. W. Rodell*). A male was seen on a hawthorn hedge near Barker's Lane, Bedford, on 18th March by *H. A. S. Key* and *H. A. W. Southon*. It was busily engaged in "hawking" insects.

RED-BACKED SHRIKE (*Lanius c. collurio*)—*A. A. Collier* watched a male by the Icknield Way on 18th July. The members present at the field excursion to Cooper's Hill, Ampthill, on 23rd July, saw a pair of adult birds feeding their four young which were perched on brambles.

WAXWING (*Bombycilla g. garrulus*)—There was an "invasion" of Waxwings during the early months of the year. The following reports were received (those recorded in *British Birds* being marked *):—

One male seen feeding on berries at Flitwick Manor on 11th January (*W. G. Sharpe*); two seen at Astey Wood, Stagsden on 17th January (*B. B. West*); five or six at Eaton Socon on 7th February (*C. F. Tebbutt*);* one in Gloucester Road, Bedford, on 10th February (*M. H. Crummie*); one feeding on rose hips and withered grapes in the garden of 43 Amptill Street, Bedford, on 12th February (*C. Crummie*); four in Luton on 13th February, six on 23rd and two on 26th (per *W. E. Clegg, Mrs. M. H. McAdam, Miss B. M. Clutton and J. Hornett*);* three at Legrave from 8th to 13th February (*S. W. Rodell*); one picked up dead in St. Leonard's Avenue, Bedford, in late February (*G. W. Emery*); one frequented the grounds of Bedford County Hospital from 28th March till 1st April (*Dr. G. A. Metcalfe*); one seen feeding on Cotoneaster berries in the garden of 30 Gt. Northern Road, Dunstable, by *H. Sargent* on 11th March; one in St. Cuthbert's Street, Bedford, on 3rd April (*F. C. Gribble*). Also reported by one of the employees as having occurred on the filter beds at the Bedford Sewage Farm during the snowy period.

WARBLERS—Reports of first arrivals. The omission of any species indicates that the birds had obviously arrived some considerable time prior to observation.

CHIFFCHAFF (*Phylloscopus c. collybita*)—One at Bedford Sewage Farm on 20th March (*H. A. S. Key*).

WILLOW-WARBLER (*Phylloscopus t. trochilus*)—One seen at Flitwick Woods on 23rd March (*W. G. Sharpe*).

GRASSHOPPER-WARBLER (*Locustella n. noevia*)—One heard at Flitwick Moor on 19th April (*K. Piercy*).

BLACKCAP (*Sylvia a. atricapilla*)—A pair were seen near Tingrith on 19th April (*W. G. Sharpe*).

WHITETHROAT (*Sylvia c. communis*)—Two seen on the Icknield Way on 12th April (*A. A. Collier*).

LESSER WHITETHROAT (*Sylvia c. curruca*)—One seen by *A. A. Collier* at the same time and place as above.

RING-OUZEL (*Turdus t. torquata*)—The keepers at Whipsnade Zoo reported that a pair of these birds had been seen feeding near the elephant house on several occasions during the autumn (*Dr. G. M. Vevers*).

BLACKBIRD (*Turdus m. merula*)—A piebald specimen was seen at Cardington on 7th December by *H. A. S. Key*.

WHEATEAR (*Oenanthe æ oenanthe*)—Two males were observed by Kempston Hardwick claypit on 5th April (*F. C. Gribble* and *H. A. W. Southon*); two birds were seen at Pictshill, Turvey on 17th April (*D. W. Elliott*); a dead bird was picked up at Southill during April, and one was seen flying near Broom during the last week in August by *F. White*; a female was seen near Radwell on 20th August (*H. A. S. Key*); another near Bletsoe on 12th August (*F. G. Godber*); and a further one near Westoning on 3rd September (*Ray Palmer*).

WHINCHAT (*Saxicola rubetra*)—Reported from several localities. Two pairs successfully reared young at Bedford Sewage Farm (*H. A. S. Key*).

BRITISH STONECHAT (*Saxicola torquata hibernans*)—One male was seen near Millbrook on 27th April (*W. G. Sharpe* and *C. M. Crisp*).

REDSTART (*Phænicurus p. phænicurus*)—Several pairs again nested in the county. The first arrival (male) was seen on 26th April (*W. G. Sharpe*)—the locality is withheld for obvious reasons.

NIGHTINGALE (*Luscinia m. megarhyncha*)—A male was heard singing in Deadmansey Wood, Markyate, on 17th April (*H. Cole*).

SWALLOW (*Hirundo r. rustica*)—A bird of this species flew over Bromham Bridge during the evening of 20th March, at a distance of only a few yards from the observers, who were thus able to see all the characters and to identify it. Two days' later, another, or possibly the same bird, was seen at Felmersham gravel pits. As the River Ouse was in full flood at the time, most probably the bird had followed its course upstream to reach the second locality. At any rate no further birds were seen until the main arrival early in April. This is by far the earliest recorded occurrence in Bedfordshire (*H. A. S. Key* and *H. A. W.*

Southon). One was seen flying over Bedford Sewage Farm on 5th October (*H. A. S. Key*).

HOUSE-MARTIN (*Delichon u. urbica*)—The first arrivals (3) were seen at Felmersham gravel pits on 12th April (*F. C. Gribble*).

SAND-MARTIN (*Riparia r. riparia*)—A party of about twenty was seen at Bedford Sewage Farm on 3rd April (*H. A. S. Key*).

SWIFT (*Apus a. apus*)—A few were seen at Clifton by *K. Piercy* on 4th May. *F. C. Gribble* saw a bird over Bedford on 29th September.

HOPOE (*Upupa e. epops*)—As reported in the *Sunday Times*, a Hoopoe visited the garden of Mrs. M. Bristow of Biddenham on the 8th and 9th of April, and was identified by children who were familiar with the species in India. Towards the end of July another Hoopoe arrived in the garden of Mr. G. Denton of Podington and stayed in the district for about a fortnight. On several occasions it was seen to elevate its crest (per *Col. R. R. B. Orlebar*).

BRITISH GREAT SPOTTED WOODPECKER (*Dryobates major anglicus*)—One was seen "drumming" on a tree near Stafford Bridge, Oakley, on 14th September (*H. A. S. Key*).

WRYNECK (*Jynx t. torquilla*)—A male bird was seen in a wood in mid. Beds. by *W. G. Sharpe* on 29th June. This is the first reported occurrence in the county for many years. The bird was subsequently seen on a number of occasions.

CUCKOO (*Cuculus c. canorus*)—A male bird was seen and heard at Flitwick on 10th April by *W. G. Sharpe*.

SHORT-EARED OWL (*Asio f. flammeus*)—A freshly killed bird was picked up at Felmersham gravel pits by *H. A. S. Key* on 21st November.

PEREGRINE FALCON (*Falco p. peregrinus*)—A female frequented the Chellington-Felmersham area from 21st October onwards and was seen on many occasions. A favourite perch was a tree in Chellington Churchyard overlooking the River Ouse (*Miss G. H. Day*).

HOBBY (*Falco s. subbuteo*)—*C. F. Tebbutt* reported that one had been accidentally shot at Roxton during the late autumn.

COMMON BUZZARD (*Buteo b. buteo*)—One was seen near Bletsoe by *F. G. Godber* during June and another was seen by *F. C. Gribble* as it circled high above St. Paul's Church, Bedford, on 28th May.

[KITE]—Three birds which may have been Kites (*Milvus m. milvus*) flew over the Flitwick area on 23rd April and were observed by *C. M. Crisp*, who stated that apart from the buzzard-like size of the birds, his attention was arrested by the obvious deep forking of the tails. In the sunlight, the birds, which were slowly moving towards the N.E. in wide circles with outstretched pinions, appeared to be of a rich reddish-brown colour. Unfortunately, the observer did not notice such diagnostic characters as white patches under the wings, whereby the species could have been confirmed.

GEESE (*Anseres*)—Among the several reports received, the following occurrences of "grey geese" are worthy of note:—fifteen flew westwards over Radwell on 9th January (*H. A. S. Key*), twenty in a like direction over Bedford on 27th January (*F. C. Gribble*) and six passed over Wootton Green flying in a northerly direction sometime during mid. October (*Major P. Reid*, per *F. G. Godber*). I am informed that the latter is a regular annual occurrence.

SURFACE-FEEDING DUCKS—The "freeze-up" caused much fluctuation in the numbers of Mallard (*Anas p. platyrhynchos*), Wigeon (*Anas penelope*) and Teal (*Anas c. crecca*), but some parties of Mallard together with a few Wigeon were occasionally seen resting well out on the ice of certain pools. As the waterways became unlocked, the above species returned in their usual annual numbers. The winter-visitors returned during the autumn at about the usual time. (See 1946 JOURNAL for details.)

GADWALL (*Anas strepera*)—The drake seen at Drakelow Pond, Woburn, on 23rd November and 27th December may have been an "escape".

GARGANEY (*Anas querquedula*)—*F. C. Gribble* saw the first summer arrival (a drake) at Bedford Sewage Farm on 29th March. Five birds were present on 6th April but they did not stay.

PINTAIL (*Anas a. acuta*)—A number of birds (the maximum in any one instance being four) were seen at Bedford Sewage Farm, Southill Lake and Felmersham gravel pits on a number of occasions from 14th January to 29th

March. A drake frequented Southill Lake from 7th to 14th December (*H. A. S. Key, K. Piercy and F. C. Gribble*).

SHOVELLER (*Spatula clypeata*)—From January to April a few birds were observed intermittently at Bedford Sewage Farm, and six were seen at Fenlake gravel pits, Harrowden, on 11th May; a pair were seen at Felmersham gravel pits on 25th May and a female at Bedford Sewage Farm on 8th June (*F. C. Gribble, H. A. S. Key and Bedford School*). There has been no record of the breeding of this species in the county for many years.

DIVING-DUCKS—The foregoing remarks on "surface-feeders" also apply to this class. A drake Pochard (*Aythya ferina*) was seen at Felmersham on 22nd June (*F. C. Gribble*).

GOLDEN EYE (*Bucephala c. clangula*)—Small numbers were observed at Bedford Sewage Farm, Southill lake, Felmersham gravel pits and Henlow gravel pits on several occasions from 5th January to 16th April, the largest party being one of eight at Southill lake on 12th January. One was seen at the latter place on 14th December (*K. Piercy, D. W. Snow, F. C. Gribble and H. A. S. Key*).

COMMON SCOTER (*Melanitta n. nigra*)—One was seen on the River Ouse near Renhold on 21st February (*E. T. Williamson*).

GOOSANDER (*Mergus m. merganser*)—A female was at Southill lake on 12th January (*K. Piercy*); one at Bedford Sewage Farm from 20th to 26th January, and one at Kempston Hardwick claypit on 28th November (*H. A. S. Key*); one at Kempston Hardwick on 16th February and another at Felmersham gravel pits on 26th April (*F. C. Gribble*).

SMEW (*Mergus albellus*)—Two seen at Felmersham on 15th and 16th January; one at Kempston Hardwick on 19th January and 16th February and three at Bedford Sewage Farm on 5th February (*D. W. Snow, F. C. Gribble and H. A. S. Key*).

CORMORANT (*Phalacrocorax c. carbo*)—One seen at Southill Park on 13th April (*K. Piercy*), and one at Bedford Sewage Farm on 26th April (*H. A. S. Key*).

SLAVONIAN GREBE (*Podiceps auritus*)—An adult male was observed at Bedford Sewage Farm on 9th January (*H. A. S. Key*).

BLACK-NECKED GREBE (*Podiceps n. nigricollis*)—During the afternoon of 9th March, *H. A. S. Key* noticed a small black and white Grebe on the River Ouse near the entrance to Bedford Sewage Farm. On viewing it at a range of some 60–70 yards with a x60 telescope the observer was surprised to discover that the bird was an adult Black-necked Grebe in winter plumage. Careful sketches were made on the spot, and such diagnostic characteristics as the slim uptilted beak, and the blackish-brown mark on the head which extended to below the eye, were noted. The field notes were compared with the description in the *Handbook of British Birds*, and the identification confirmed. This is the first known record of the occurrence of this bird in the county, but as it has at times been recorded in neighbouring counties it is almost certain to have been overlooked previously. (*H. Cole* of Luton saw a bird which he believes was also of this species on the River Lea at East Hyde on 7th, 8th and 15th February. It was studied at a range of c. 50 yards through binoculars. Mr. Cole made a number of sketches and noticed that the dark head markings in this specimen also extended below the eye, but he remarked that the rapid movements of the bird prevented him from studying the beak. The identity of this bird therefore could not be confirmed.)

BLACK THROATED DIVER (*Colymbus a. arcticus*)—A dead bird was recovered by members of the *Bedford School Society* from the claypit at Kempston Hardwick on 28th March. The details of its plumage and the measurements taken were compared with the *Handbook* and the specimen was found to be an immature bird of this species.

RED-THROATED DIVER (*Colymbus stellatus*)—One was identified on the River Ouse near Kempston on 22nd February (*Bedford School*).

BAR-TAILED GODWIT (*Limosa l. lapponica*)—One seen at Bedford Sewage Farm on 18th September (*F. C. Gribble*).

BLACK-TAILED GODWIT (*Limosa l. limosa*)—One visited Bedford Sewage Farm on 16th March (*H. A. S. Key*). Another was seen at Felmersham gravel pits on 10th May (*F. C. Gribble*).

COMMON CURLEW (*Numenius a. arquata*)—One passed over Whipsnade Zoo on 19th March (*Overseer Bates*); one flew over Bury End, Stagsden on 25th July (*D. W. Elliott*); one visited Bedford Sewage Farm on 1st September (*H. A. S. Key*) and *F. G. R. Soper* saw another flying over Stevington on 7th November.

[**GREAT SNIPE** (*Capella media*)]—A bird, thought to be a juvenile Great Snipe, was seen by *H. A. S. Key*, *F. C. Gribble* and *H. A. W. Southon* at Bedford Sewage Farm on 20th August. A party of Common Snipe (*Capella g. gallinago*) were disturbed from a boggy field, and some time afterwards another Snipe got up from among rushy tussocks at the feet of the observers. The flight of the bird and its general appearance were similar to those of the Woodcock (*Scolopax r. rusticola*) and the bird dropped into the ditch beyond the boundary hedge after flying only a short distance at a low elevation—emitting an occasional grunting note. No white outer tail feathers were, however, seen. The facts were communicated to *Mr. B. W. Tucker* who, while agreeing that there was every possibility of the bird being a Great Snipe, suggested that, as the observations lacked the confirmatory character of the tail feathers, the use of square brackets was called for.

JACK SNIPE (*Lymnocyrtus minimus*)—Reported during the autumn and winter from such places as Kempston Hardwick claypit, Flitton Moor and Bedford Sewage Farm, the first-arrival being seen at the latter place on 18th September by *F. C. Gribble*.

DUNLIN (*Calidris alpina*)—One was seen at Bedford Sewage Farm on 2nd February and another in the same locality from 16th to 21st March (*F. C. Gribble* and *H. A. S. Key*).

RUFF (*Philomachus p. pugnax*)—One seen at Bedford Sewage Farm on 23rd March; three and then four here from 24th to 27th August, and another from 7th to 10th September (*H. A. S. Key*, *F. C. Gribble* and *J. A. Miller*).

COMMON SANDPIPER (*Actitis hypoleucos*)—Single birds visited such areas as Felmersham gravel pits; the Bedford Sewage Farm; Longholme, Bedford, and Kempston Hardwick, etc., between 24th April and 25th May, and on 17th September (*D. W. Snow*, *C. Payne*, *F. C. Gribble* and *Bedford School*).

GREEN SANDPIPER (*Tringa ochropus*)—The above remarks also apply to this species. In addition to the aforementioned localities *C. F. Tebbutt* saw one at Duloe. The dates and total numbers were:—24th March (2); 26th–31st July (5); 27th August (1); 9th–21st September (9); the largest party being four birds.

BRITISH REDSHANK (*Tringa totanus britannica*)—The first summer visitor was seen at Bedford Sewage Farm on 15th March (*F. C. Gribble*).

RINGED PLOVER (*Charadrius h. hiaticula*)—One observed at Felmersham gravel pits on 26th April (*F. C. Gribble*).

GOLDEN PLOVER (*Pluvialis apricaria*)—First party of winter visitors (c. 100) observed at Bedford Sewage Farm on 21st October (*H. A. S. Key*).

BLACK TERN (*Chlidonias n. niger*)—One at Felmersham gravel pits on 12th April—a remarkably early date—(*F. C. Gribble*); one juvenile male at Bedford Sewage Farm from 21st to 25th September (*H. A. S. Key* and *D. W. Snow*).

There was considerable movement of Arctic and Common Terns up the Ouse Valley from 24th April till mid. May, while outside this area one was recorded from Woburn during the last week in April (*Duke of Bedford*). Among the birds identified were:—

COMMON TERN (*Sterna h. hirundo*)—One at Bedford Sewage Farm on 24th April and one on 26th; two at Longholme, Bedford, on 25th; four at Bromham on 26th and five at Felmersham on 27th. Two were seen flying downstream at Willington on 15th June.

ARCTIC TERN (*Sterna macrura*)—One at Southill lake on 27th and 28th April; one at Felmersham on 5th May, and one corpse was discovered at this last locality on 25th May (*F. C. Gribble*, *K. Piercy*, *H. A. S. Key* and *I. J. N. F. Lees*).

LITTLE TERN (*Sterna a. albifrons*)—Four were seen at Kempston Hardwick claypit on 23rd May (*Bedford School*). These birds, which only stayed in the area for twenty minutes or so, were correctly identified, and some good field notes and sketches were made.

GULLS—During the severe weather of the early months of the year many gulls passed over the county, often along the valley of the River Ouse, where **BLACK HEADED GULLS** (*Larus r. ridibundus*) were commonly seen and with them a number of **COMMON GULLS** (*Larus c. canus*). Among the larger gulls identified were:—

HERRING GULL (*Larus a. argentatus*)—Three at Sharnbrook on 16th January, one at Bedford Sewage Farm on 9th February, and eleven there on 13th February (*H. A. S. Key*); from one to four seen feeding in gardens at Flitwick from 7th to 9th March following heavy snowfalls (*Ray Palmer*).

LESSER BLACK BACKED GULL (*Larus fuscus*)—Two seen at Kempston Hardwick on 16th February and one at Bedford Sewage Farm on 8th March (*F. C. Gribble*).

KITTIWAKE (*Rissa t. tridactyla*)—Two were seen on a flooded football pitch at Barker's Lane, Bedford, on 15th March (*H. A. S. Key*).

QUAIL (*Coturnix c. coturnix*)—Several birds were heard in the Steppingley and Stagsden areas from 25th May onwards. A cock Quail was seen during the season at Wick End, Stagsden, and one was shot during the autumn in the Heath and Reach area (*D. W. Elliott* and *W. G. Sharpe*). A nest containing ten eggs was destroyed by pea-pickers on the farm of *Mr. Phillip Bath* at Roxton, on 5th August. Some of the eggs (which were about seven days incubated) were recovered and given to *E. O. Squire* of Basmead Manor, who placed them under a bantam and was successful in hatching and rearing two chicks, which he fed on "ants' eggs". These birds lived until December.

HENRY A. S. KEY.

MAMMALS

There are two additions to record in the list of Bedfordshire mammals, for which we are indebted to Dr. G. M. Vevers, of the Zoological Society of London, whose article on wild mammals at Whipsnade is published in this JOURNAL:—

YELLOW-NECKED, or DE WINTON'S, MOUSE, *Apodemus flavicollis wintoni* (Barrett-Hamilton). Several specimens of this large mouse have been recorded at Whipsnade, being brought in by Dr. Vevers' cat.

FAT DORMOUSE, or SQUIRREL-TAILED DORMOUSE, *Glis glis* Linn. A south European species, introduced at Tring about 1902 by Lord Walter Rothschild and now naturalised. This rodent has spread to a radius of twelve to fifteen miles from Tring, and is well established within this area. Numerous specimens have been caught at Whipsnade since the Zoological Park was established there sixteen years ago.

Another point of interest is that the Pigmy Shrew seems to be far more abundant than it is usually supposed to be. Here again Dr. Vevers' cat has performed a useful service by bringing in a number of specimens. The Pigmy Shrew has also been recorded from Stagsden by D. B. Elliott, who has known it on his farm there for many years.

The Black Rat was included in the county list on the strength of one specimen shot at Bromham in 1942. Now there is a record of what is presumed to be this species seen at Clapham in August, 1947, by F. L. Godber.

The Common Dormouse is recorded from Whipsnade by Dr. Vevers, this being only the second known Bedfordshire locality. Several records of nests have been reported by R. H. F. Cook from just over the Hertfordshire border, in the neighbourhood of Lilley and Pirton.

RAY PALMER.

NOTES AND OBSERVATIONS

A GREEN HUNTING SPIDER

One of the most strikingly beautiful of British spiders has been found in Bedfordshire. This is *Micrommata virescens*, the female of which is over $\frac{1}{2}$ inch long, and bright green in colour with a darker spear-shaped mark on the abdomen; the male is more slender with the upper surface of the abdomen bright yellow with three scarlet streaks. Two females were taken amongst ground debris in the State Forest at Clophill, on 14th April, 1943.—B. VERDCOURT.

THORN BUG AT KING'S WOOD

Centratulus cornutus, the Membracid bug that closely resembles a thorn, has not apparently been previously recorded from the county. It occurs at King's Wood, Heath and Reach, and has been taken on the following occasions: 28.9.1946, nymph on ash (B.V.); 22.6.1947, adults common on ferns, etc. (B.L.R., B.V. and V.H.C.).—B. VERDCOURT.

LEPIDOPTERA RECORDS

Two Lepidoptera that chanced to catch a Hymenopterist's eye are worth recording. On 28th June, 1947, I took a female of the Yellow-legged Clearwing (*Aegeria andreniformis* Lasp.) flying around hawthorn at the end of the Forty Foot Lane, Souldrop. The insect was named by our versatile Recorder of Mollusca, who performed a post-mortem and extracted 53 eggs. The following day I saw a fresh example of the White Letter Hairstreak (*Strymon w. album* Knoch.) on an elm by the roadside at the State Forest, Clophill.—V. H. CHAMBERS.

WATERFALL FAUNA.

Natural waterfalls are not a common feature of the Bedfordshire countryside, but the County Council often produce similar conditions when they bridge some of our smaller streams.

A miniature waterfall has been produced in this way at Harlington (Map ref. 25/050300) and, as such localised habitats often support a flora and fauna of their own, this was examined in mid July, 1947.

The bed of the stream beneath the road is partly of concrete and on the downstream side of the bridge this projects as a shell, over which the water flows very rapidly. The bed was partly covered by clumps of green algae and between these, exposed to the full force of the water, were numbers of "Black Fly" (*Simulium*) larvae at different stages of growth. These larvae are much modified for life in running water and are attached to the bottom by a posterior sucker.

An examination of the algal clumps produced a pupal case from which an adult *Simulium* had emerged (identified as *S. morsitans* Edwards) and a fully developed adult was found completely immersed in the water—possibly ovipositing). A single larva of *Dicranota* (Diptera—*Tipulidae*) was also found and several mayfly larvae (*Baetidae*) among the algal clumps.

More interesting perhaps was the capture of two small Stratiomyid flies, on the wall of the bridge just above the water; these were *Oxycera*

terminata Mg. (one female) and *Oxycera morrisii* Curtis (two females). Both are new county records, and *O. terminata* is apparently only known from Dorsetshire and Herefordshire. The larvae of *O. morrisii* have been recorded from "confervae on the face of a mill-race dam", and the occurrence of both species together suggests that *O. terminata* has a similar life history and that both flies had emerged from the stream.

—B. R. LAURENCE.

RARE SAWFLY LARVAE AT BEDFORD

On 24th June, 1947, two leaf-rolls containing single larvae of a species of *Pamphilius*, probably *P. inanitus* Vill., were discovered on a spray from a Paul's Scarlet Climber growing in a Bedford garden. The larvae of this genus of sawflies—which all build leaf-rolls—are rarely found. A thorough search revealed eight more on the same tree, but on no other rose in the garden.

The two on the gathered spray were kept in a jar for observation. The leaf-rolls were spirals, $1\frac{1}{2}$ inches long, closed at the outer end. The larvae were yellowish green with darker heads, and they remained entirely inside the leaf-rolls except to protrude their heads and forelegs when feeding or moving. The larvae were able to attach the open end of their abodes to any leaf on which they were feeding, detach them and move on to a fresh leaf. They fed in this way for about a month, but did not appear to grow appreciably. On 24th and 28th July, respectively, the larvae left the leaf-rolls and burrowed into the moist sand provided.

One is hibernating in a small cell against the glass at a depth of $1\frac{1}{2}$ inches. It appears to be about $\frac{5}{8}$ inch long and is now a brighter green with a shiny black head, and up to 18th December still moves quite actively.—PAMELA SOPER.

THE COLORADO BEETLE IN BEDFORDSHIRE.

The first serious outbreaks of Colorado Beetle in Bedfordshire occurred during July, 1947, after small infestations had already been reported from other parts of the country.

On 9th July eight larvae were found on volunteer potato plants growing in a crop of Brussels sprouts at Cotton End, near Bedford. Potato crops within a mile radius were inspected, but no more larvae were found.

On 12th July a larva was reported from allotments at Kempston, and further search revealed a total of 33 larvae from the same plot.

On 15th July the pest was reported from Eversholt, where about 54 larvae were found. Inspection of the surrounding area produced no more specimens.

On 24th July a potato crop at Toddington was found to be infested, and a total of 28 larvae was found, some of which had buried themselves for pupation, together with seven pupae.

On 25th July larvae were found on main crop potatoes at Maulden Road, Flitwick. Further search within a few yards radius produced about 120 larvae, mostly approaching maturity. On the arrival of the Ministry of Agriculture entomologists the soil beneath the infested

plants was sieved and produced a considerable number of pupae and pupating larvae, bringing the total to 178 larvae and 47 pupae. The soil was then injected with carbon bisulphide and some of the surrounding crops sprayed with lead arsenate. The potato crops within half a mile radius, amounting to some 300 acres, were then dusted with D.D.T. dust.

On 15th August an adult beetle was found on potato haulm after a crop had been lifted at Westoning. Further search of the haulm, followed by the setting out of growing trap plants, resulted in about sixteen beetles and one larva being found.

Mr. A. W. Colling, Assistant Provincial Entomologist of the Ministry of Agriculture, to whom I am indebted for some of the above data, hopes that members of the Society will keep a careful watch for adults or larvae of the Colorado beetle, and for eaten potato foliage which might indicate their presence, and report any suspicious occurrences.—
ED.

BLACK RAT AT CLAPHAM?

On 18th August, 1947, I was sitting on the lawn of one of the gardens in Clapham which back on to the river. I had started to eat an apple, which proved to be too sour, and I threw it into the water. A few moments later I noticed ripples on the water, and on standing up I saw that a rat was swimming along, pushing the apple core in front of it or holding it in its teeth. The rat swam towards the bank when I disturbed it, but it returned to the core when I sat down again. The game was broken up by the arrival of friends who were not "nature minded".

The best view I got of the rat was at a distance of six feet. It was black in colour all over its back, and was about two thirds of the size of an adult brown rat. Its face appeared to be more rounded and its tail longer than that of the brown rat, and its build was more delicate. It looked to me like a Black Rat, but my knowledge of mammals is not good enough to make me certain. I am sure it was not a water vole.—
FRANK L. GODBER.

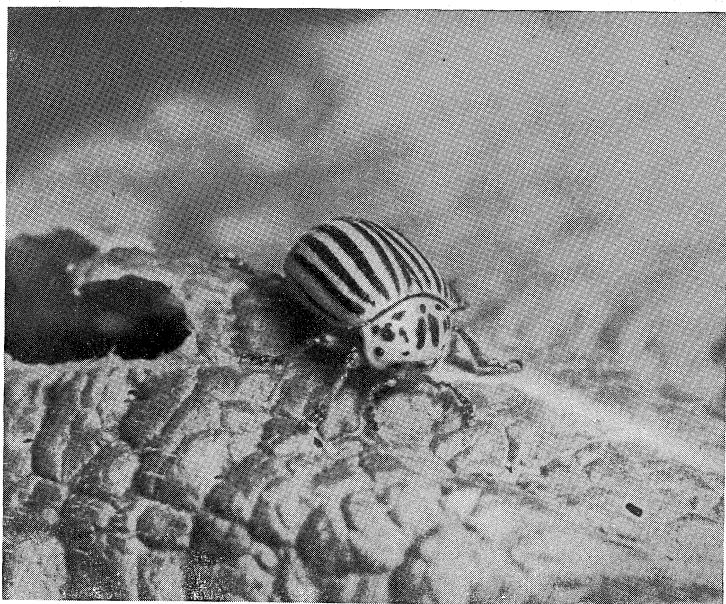
(A Black Rat was shot by Mr. J. Saunderson at Bromham in September, 1942. I am not aware of any other record.—ED.)

BEDFORDSHIRE NATURALISTS

II.—JAMES SAUNDERS (1839-1925)

By J. G. DONY

James Saunders was born at Salisbury on 30th March, 1839. His father, a cordwainer, died young, and James, after short spells of work at his father's bench and as a pupil teacher in a private school, came to Luton in 1859. The straw hat industry was at that time going through the period of its greatest expansion and, after having worked for a book-seller for a few weeks, Saunders found employment as a warehouseman with Vyse's, at that time the largest firm in the town. About 1885 he became a manufacturer on his own account and maintained an active interest in the firm until his death.



Photographs by Ray Palmer.

THE COLORADO BEETLE IN BEDFORDSHIRE

Enlarged view of adult, and (below) larvae feeding on the remains of a potato plant they have nearly stripped of leaves.

(Block kindly loaned by the Editor of "Country-Side".)

In the meantime he had married Mary Ann Cole, a farmer's daughter, who died in 1866 leaving him a young family to care for. A second marriage, to Caroline Howard, who came from Islington, in 1867, was equally tragic, as she died ten years later leaving him a still larger family. It was at this point, while still relatively young, but despairing of the future and striving to find the meaning of life, and after drugs had failed to provide the answer, that on the advice of an old friend he turned his attentions to field botany.

In his youth in Wiltshire he had been interested in the countryside and since his arrival in Bedfordshire he had laid the foundations of sound work in a study of geology. Fortune had favoured him here, as he was able to make a first hand study of the chalk exposures made by excavations for the Midland Railway during its extension through South Bedfordshire in the 'sixties. He was always proud of the privilege allowed him of riding on the footplate of the first engine to pass through Chalton Cutting. He was the first Bedfordshire naturalist to link natural life with geology.

In 1878 he became associated with the newly formed Bedfordshire Natural History Society and met John McLaren, John Hamson and Arthur Ransome, and put all his energy into the survey of Bedfordshire botany which had been begun by William Hillhouse in 1875. It was soon obvious that Saunders's enthusiasm and capacity for work outstripped that of his co-workers and in a short time the survey became almost wholly his work.

His first botanical work, begun so energetically, was limited to flowering plants; but in a short time his interest had turned also to mosses, liverworts and stoneworts. His herbarium of Bedfordshire flowering plants, now at Luton Museum, was started in 1878, but contains few specimens collected after 1885. The survey of Bedfordshire botany was never properly completed; but his *Wild Flowers of Bedfordshire* (1897) was the first serious attempt to list the flowering plants of the county since Charles Abbot's *Flora Bedfordiensis*, written a century before. *The Field Flowers of Bedfordshire* (1911) was little more than a reprint of this, as he himself made clear in his preface; but it is to be regretted that he did not incorporate the large amount of work done in the meantime by John Hamson and G. C. Druce.

It would be unfair to judge Saunders's worth as a botanist entirely by his work on flowering plants. He quickly gained a national reputation for his knowledge of mosses, but soon turned his attention to the mycetozoa (slime fungi) with which his name will always be associated. By this time (1890) he had met Charles Crouch and begun a friendship that was to last many years, also Arthur Lister, the authority on mycetozoa. It was his work in this field which was largely responsible for the honour conferred upon him of being elected an Associate of the Linnean Society in February, 1900.

It is difficult to assess the value of his work, as there can have been few naturalists who laboured under more trying circumstances. Increasing domestic difficulties and long hours in the hat industry in spring and summer would have deterred many. According to Crouch he had little visual memory and had to trace each specimen, however

common the species was, in a flora. His books confirm this defect, which probably accounts for his overlooking a number of plants which must have been frequent in woods he knew well, and for his greater interest in the lower forms of plant life which demanded close attention and could not be named at sight. In this connection Dr. F. Seymour Lloyd recalls that his sole sustenance in his long excursions was raw eggs and bananas, the shells and skins of which he used to mark plants he wished to see again. He tended to take the same walk frequently, probably because his time was limited, and although he knew a few areas exceptionally well there were many parts of the county he did not visit. He had a tendency, which it is easy to understand, to consider plants he found in these places to be more widely distributed in the county than was often the case, and plants he found infrequently to be of a less limited distribution than they were. He was sometimes careless in his records, and many of the plants he recorded for the county at Pepperstock should be attributed to Hertfordshire. He knew this neighbourhood well, as he often preached in the little Baptist Chapel a few yards within the county boundary. A Nonconformist, probably because of his background, his sermons and conversation revealed, however, a mysticism which could not be confined within the narrow doctrines of any sect.

His work was not limited to botany and geology, for he had more than a passing interest in meteorology, entomology and conchology. A son, Albert James, who pre-deceased him, made a study of the Lepidoptera of the south of the county. James Saunders wrote more than any other Bedfordshire naturalist and the list, added to this article, of the more important of his books and papers relating to Bedfordshire natural history shows the nature and breadth of his work. He wrote also on the cryptogamic flora of Hertfordshire and Buckinghamshire, and of discoveries made when on holidays in Norfolk and Wiltshire. He was an authority on the hat industry, about which he wrote a great deal, and he produced at least one poem. He was a popular lecturer and contributed frequently to the local press.

For the last thirteen years of his life he was a member of Luton Library Committee and a faithful advocate of the need for a Public Museum, which was started a year after his death. I knew him in his later years, his faculties and enthusiasm unimpaired, and have to be grateful to him for his willingness to help a younger man over his initial difficulties.

Had the circumstances of his life been different he would, undoubtedly, have been one of the greatest British naturalists. In the list of those who devoted their attentions to a more limited sphere he must take second place only to Charles Abbott among Bedfordshire workers.

THE MOSSES OF SOUTH BEDFORDSHIRE, *Trans. Beds. Nat. Hist. Soc.*, 1882.

BRYOLOGICAL NOTES FROM SOUTH BEDS., *Mid. Nat.*, 1882.

THE FLORA OF SOUTH BEDFORDSHIRE, *J. Bot.*, 1883.

NITELLA MUCRONATA IN BEDFORDSHIRE, *Mid. Nat.*, 1884.

THE WILD FLOWERS OF SOUTH BEDFORDSHIRE, *Trans. Beds. Nat. Hist. Soc.*, 1885.

ADDITIONAL CRYPTOGAMIC NOTES ON SOUTH BEDS., *ibid.*

- NOTES ON CHARACEAE GATHERED IN BEDFORDSHIRE IN 1882, *ibid.*
NOTES ON THE GEOLOGY OF SOUTH BEDFORDSHIRE, *Geol. Mag.*, 1890.
THE MYCETOZOA OF SOUTH BEDS. AND NORTH HERTS., *J. Bot.*, 1893.
THE WILD FLOWERS OF BEDFORDSHIRE (in the *Beds. Advertiser*), 1897-8.
NOTES ON THE FISH OF THE UPPER LEA, *Trans. Herts. Nat. Hist. Soc.*, 1902.
ON THE SHRINKAGE OF THE SOURCES OF THE UPPER LEA, *ibid.*, 1903.
THE CRYPTOGAMS OF BEDFORDSHIRE, *V.C.H. (Beds.)*, 1904.
THE LICHENS OF BEDFORDSHIRE (with E. M. Holmes), *ibid.*
THE MYCETOZOA OF BEDFORDSHIRE, *ibid.*
WITCHES' BROOMS, *Trans. Herts. Nat. Hist. Soc.*, 1906.
THE ALTERATIONS TO THE FLORA OF TOTTERNHOE CAUSED BY DRAINING, *ibid.*, 1908.
THE FIELD FLOWERS OF BEDFORDSHIRE, 1911.
MYCETOZOA IN BEDFORDSHIRE, *J. Bot.*, 1919.

OBITUARY

D. O. BOYD, B.SC., D.I.C., F.R.E.S., F.R.H.S.

We regret to record the death on 22nd September, 1947, of our member, D. O. Boyd.

David Ogilvy Boyd, the only son of the Rev. M. O. Boyd, was born on 1st November, 1906, at Cape Town, South Africa. Of delicate health from an early age, he was educated and matriculated privately. In 1928 he entered the University of Reading to study horticulture and graduated in 1932, after a delay of one year through serious illness. From 1932-33 he studied entomology at the Imperial College of Science and Technology (University of London), where he carried out some research work upon the visits of bumble-bees to flowers, for which he was awarded the Diploma of the Imperial College. Although a contemporary of his, the writer did not meet him during this period. From 1933-37 he was engaged upon research upon strawberry pests, carried out during the winter months at the University, Reading, and during the summer months at the Botley Experimental Fruit Station, Hampshire. His next move was in January, 1938, to take up an appointment as Technical Assistant in Horticulture with the Land Settlement Association, near Carlisle. In 1940 he took up a small nursery at Fern-down, Dorset, which he ran with his wife's assistance for over four years. At the same time he undertook the duties of part-time secretary of the horticultural section of the Dorset Farmers' Union, besides taking an active part in other local and county horticultural associations. In 1945 he was appointed Horticultural Secretary to the Bedfordshire and Huntingdonshire branch of the National Farmers' Union and moved to Bromham. Little more than a year later he was ordered a complete rest following a diagnosis of pulmonary tuberculosis. When the writer last saw him in May he had obviously become worse. He remained cheerful and took whatever opportunity was allowed him to observe native bees in his garden, but never recovered.

Apart from his professional work, he was a keen student of the Hymenoptera Aculeata and his collection has been presented by his wife to the British Museum (Natural History). He published articles and notes in the publications of the Society for British Entomology

during 1934-43, viz, *Trans. Soc. Brit. Ent.* 1: 135-8, *Jour. Soc. Brit. Ent.* 1: 9, 93-4, 129-31; 2: 160-4. His best known discovery was the addition to the British list of the mason wasp *Microdynerus exilis* (H.-Schaeff.) (see Jones, 1937, *Ent. Mon. Mag.* 73: 13-17). He served upon the Council of the Society for British Entomology from 1935-37 and as Librarian, 1935-36. During his short residence in the county pressure of work allowed him to make only a few collecting trips, but it is evident that the county and Society have lost an able naturalist.

To his wife, whom he married in 1938, members will join in our sympathy for the untimely loss of her husband.

V. H. C.

A BIBLIOGRAPHY OF ENTOMOLOGICAL NOTES RELATING TO BEDFORDSHIRE

Compiled by V. H. CHAMBERS

Although the county has been so little worked in the past, numerous entomological notes and records have been published in the national periodicals by entomologists resident in or visiting the county. The following list, brought up to the end of 1945, is the result of a search of the three principal entomological monthlies, the records being arranged under each periodical in chronological order.

1. "THE ENTOMOLOGIST"

- 1864, vol. 2, p. 325, Jennings, P. H., "*Acherontia atropos* near Luton". The Rev. Jennings, the then rector of Lilley, writes: "The notion of its being a locust prevails among the lower classes here, as in other places." Earlier in the same volume (p. 255) he records his safe arrival at Lilley, with his bees, notwithstanding "the rough road from Luton to Lilley".
- 1875, vol. 8, p. 226, King, J., "*Deiopeia pulchella* at Biggleswade".
- 1889, vol. 22, p. 46, Hill, H. A., records a diminutive *Polyommatus phloas* at Sandy.
- 1892, vol. 25, p. 275, Tomlinson, H. W., "*Colias edusa* (and var. *helice*) in Bedfordshire". Apparently of widespread occurrence during that year: taken at Clapham, from Bedford to Bromham, Bromham to Turvey and at Milton and Harlington; var. *helice* from Great Barford to Blunham.
- 1895, vol. 28, p. 308, "F.W.F.", *Deiopeia pulchella*. Taken at Bedford.
- 1898, vol. 31, p. 221, Hatton, E. A. S., "*Hesperia lineola* (and *H. thaumas*) near Bedford". In woods "two miles from Bedford".
- 1908, vol. 41, p. 156, Brocklehurst, W. S., "Capture of *Notodonta phoebe* = *tritophus* in Bedford".
- 1911, vol. 44, p. 406, Higgins, L. G., "*Sphinx convolvuli* in Bedfordshire". Taken in an office in Luton.
- 1917, vol. 50, p. 279, Stoneham, H. F., "*Macroglossa stellatarum* in Bedfordshire". At Bedford.
- 1918, vol. 51, p. 234, Nash, W. G., "*Adopaea lineola* in the Bedford district". Common and widely distributed from Kimbolton to Biggleswade and Shefford.
- 1922, vol. 55, p. 278, Nash, W. G., "*Herse convolvuli* at Bedford".
- 1923, vol. 56, p. 235, Tebbs, H. A. N., "*Polygonia c-album* in Bedfordshire". At Bedford.
- 1924, vol. 57, p. 90, Walsh, G. B., "New records for Hertfordshire Hemiptera—Heteroptera". *Picromerus bidens* from Sharpenhoe (Beds.).
- 1924, vol. 57, p. 164, Nash, W. G., "*Deiopia pulchella* at Bedford".

- 1925, vol. 58, p. 62, Nash, W. G., "*Polygonia c-album* in Beds. and Herts." At Thurleigh.
 1931, vol. 64, p. 223, Nash, W. G., "*Colias croceus*". At Bedford.
 1932, vol. 65, p. 159, Hedges, A. V., "*Vanessa antiopa* in Bedfordshire." At Milton Ernest.
 1934, vol. 67, p. 257, Nash, W. G., "*Colias hyale* in Bedfordshire". At Bedford and Luton.

2. "ENTOMOLOGIST'S MONTHLY MAGAZINE"

- 1878, vol. 15, p. 107, Greenwell-Lax, W., "*Acherontia atropos* and *Thecla quercus* near Bedford". At Stagsden.
 1899, vol. 35, p. 44, Wood, T., "*Dynastes hercules* in Bedfordshire". A South American beetle taken at Biggleswade.
 1905, vol. 41, p. 8, Crawshay, G. A., "A large community of *Vespa vulgaris*". Mentions also the finding of the beetle *Metoeus paradoxus* by his brother, presumably at Leighton Buzzard.
ibid., p. 45, Crawshay, G. A., "*Harpalus discoideus* F. and *Metoeus paradoxus* L. at Leighton Buzzard".
ibid., pp. 159-161, Crawshay, G. A., "Further notes on the capture of *Amara anthobia* Villa and the comparative morphology of *A. familiaris*, *A. anthobia* and *A. lucida*".
 Continued in *ibid.* 42 (1906) 46-50.
ibid., p. 223, Crawshay, G. A., "*Tetropium* sp? at Leighton Buzzard". A note by D. Sharp on p. 224 states: "Mr. Crawshay's insect is either *T. gabrieli* Weise or a closely allied form. If the second alternative prove to be correct I propose to call the Leighton form *T. crawshayi*".
 1908, vol. 44, p. 136, Brocklehurst, W. S., "Capture of *Notodonta phoebe* Sieb (= *tritophus* F.) in Bedfordshire".
 1923, vol. 59, pp. 256-7, Day, F. H., "Coleoptera in Bedfordshire". A long list from the R. Ouse at Tempsford.
 1928, vol. 64, p. 234, Williams, B. S., "*Helophorus nanus* Sturm in Bedfordshire". In a pond at Chiltern Green accompanied by *Octhebius impressus* Marsh., *Limnebius papposus* Muls. and *H. affinis* Marsh.
 1930, vol. 66, p. 140, Williams, B. S., "*Staphylinus fulvipes* Scop. in Bedfordshire". On Barton Hills: *S. latebricola* Gr., *Amauronyx maerkeli* Aub. and *Sternichnus harwoodianus* Will. also taken.
 1933, vol. 69, pp. 186-8, Chambers, V. H., "Some Bedfordshire Hymenoptera Aculeata". A list of 102 species.
ibid., pp. 203-4, Spooner, G. M., "Hymenoptera Aculeata from Bedfordshire". Records from Sandy and Leighton Buzzard.
 1934, vol. 70, p. 277, Chambers, V. H., "*Polygonia c-album* L. in Bedfordshire". At Ampthill.
 1937, vol. 73, p. 235, Brown, J. M., "Some insects from Bedfordshire". A number of insects in eight Orders from Cranfield.
 1938, vol. 74, pp. 134-5, Chambers, V. H., "Hymenoptera and the early Spring, 1938". Early appearances of some bees and larvae of the sawfly *Diprion sertifer* are noted.
 1942, vol. 78, pp. 91-4, Spooner, G. M., "*Priocnemis cordivalvatus* Haupt (Hym. Pompilidae) in Bedfordshire".
ibid., pp. 109-111, Spooner, G. M., "Aculeate Hymenoptera from Bedfordshire".
ibid., pp. 242-4, Roche, P. J. L., "Additions to the Bedfordshire list of Coleoptera".
 1943, vol. 79, p. 144, Roche, P. J. L., "Two scarce Longicorn beetles in Bedfordshire".
 1944, vol. 80, p. 11, Chambers, V. H., "Nidification of *Odynerus laevipes* Shuck. (Hym. Vespidae)".
ibid., p. 30, Roche, P. J. L., "Further additions to the Bedfordshire list of Coleoptera".
ibid., p. 212, Jarvis, C. MacK., "*Aromia moschata* (Col. Cerambycidae) in Bedfordshire".

- ibid.*, p. 237, Jarvis, C. MacK., "*Brachypterolus (Heterostomus) vestitus* Kies. (Col. Nitidulidae) in Bedford".
- ibid.*, p. 264, Jarvis, C. MacK., "*Agapanthia villosoviridescens* Deg. (Col. Cerambycidae) in Bedfordshire".
- ibid.*, p. 287, Jarvis, C. MacK., "*Phytoecia cylindrica* (Col. Cerambycidae) in Bedfordshire".
- 1945, vol. 81, p. 8, Verdcourt, B., "Records of Bedfordshire, Hertfordshire and Hampshire Orthoptera".
- ibid.*, p. 12, Verdcourt, B., "Further records of Bedfordshire Hemiptera".
- ibid.*, p. 42, Shaw, H. K. Airy., "Habitats of *Podops inuncta* (Hem. Pentatomidae)".
- ibid.*, p. 47, Verdcourt, B., "Records of Bedfordshire Siricidae (Hym.)".
- ibid.*, p. 47, Benson, R. B., "Some more Orthoptera County Records".
- ibid.*, p. 50, Verdcourt, B., "*Aromia moschata* (Col.) in Bedfordshire".
- ibid.*, p. 54, Shaw, H. K. Airy., "*Cis bilamellatus* (Col. Ciidae) abund antin South Bedfordshire".
- ibid.*, p. 74, Verdcourt, B., "Bedfordshire Siphonaptera".
- ibid.*, p. 75, Verdcourt, B., "Butterflies in Bedfordshire".
- ibid.*, p. 75, Verdcourt, B., "Odonata—Zygoptera from Bedfordshire".
- ibid.*, pp. 101–3, Benson, R. B., "*Emphytus basalis* (Klug) and some other interesting British sawflies (Hym. Symphyta)".
- ibid.*, p. 111, Laurence, B. R., "*Pentatoma rufipes* (Hem.) in Bedfordshire".
- ibid.*, p. 117, Laurence, B. R., "Early appearance of butterflies in Bedfordshire".
- ibid.*, p. 125, Laurence, B. R., "Syrphidae, etc. (Dipt.) in Bedfordshire".
- ibid.*, pp. 126–7, Jarvis, C. MacK., "Additions to the Bedfordshire list of Coleoptera".
- ibid.*, p. 141, Verdcourt, B., "Observations on the fauna of static water tanks".
- ibid.*, pp. 183–5, Shaw, H. K. Airy., "Additions to the list of Bedfordshire Hemiptera-Heteroptera".
- ibid.*, pp. 253–73, Bedwell, E. C., "The county distribution of the British Hemiptera-Heteroptera".

3. "ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION"

- 1891, vol. 2, p. 206, Steuart, D. H. S., A long list of Lepidoptera from Bedford.
- 1901, vol. 13, p. 140, Ellis, H. W., "*Bagous cylindrus* Payk. in Bedfordshire". From Leighton Buzzard.
- 1907, vol. 19, p. 268, —, *Aegeria andreniformis*, bred from Bedfordshire specimens, exhibited at the Entomological Society of London.
- 1910, vol. 22, p. 122, —, *Necrophorus vestigator* from Bedfordshire exhibited by W. Ellis at a meeting in Birmingham.
- 1923, vol. 35, p. 185, —, Coleoptera from Bedfordshire, including *Cassida fastuosa*, *Euconnus denticornis*, etc., exhibited by B. S. Williams at a London meeting.
- 1944, vol. 56, p. 106, Laurence, B. R., "Occurrence of *Acrydium subulatum* L. (Orthop.) in Bedfordshire".
- 1945, vol. 57, p. 60, Laurence, B. R., *vide supra*.
- ibid.*, p. 71, Laurence, B. R., "The habitats of *Chorthippus bicolor* Charp. and of *C. parallelus* Zett."
- ibid.*, p. 72, Laurence, B. R., "Diptera, etc., swept from a reed bed (*Sparganium ramosum* Huds.)".
- ibid.*, p. 91, Laurence, B. R., "Occurrence of *Odontomyia argentata* Fabr. (Dipt. Stratiomyidae) in Bedfordshire and North Herts."

ABSTRACTS OF LITERATURE ON BEDFORDSHIRE NATURAL HISTORY FOR 1947

By THE RECORDERS

The following articles relating to the natural history of Bedfordshire were published during 1947:—

1. THE BEDFORDSHIRE MAGAZINE. Vol. 1 (Nos. 1 and 2, 1947).
 - (a) "The case for nature reserves." By John G. Dony, PH.D., pp. 19–22 (illustrated). A plea is made for the conservation of threatened areas in Bedfordshire of importance from a natural history point of view, supported by examples.
 - (b) "Birds in Bedfordshire." By Keith Piercy, pp. 31–6 (illustrated). A general article illustrating the bird life of the chalk hills, the areas of gault and greensand, the Ouse valley and the towns, with notes on the numbers of some species.
 - (c) "Dean—Village in the Wilds." By C. L. F. Brown, pp. 49–55. Brief notes on the natural history of the parish are included.
2. BOTANICAL EXCHANGE CLUB. Report for 1945 (May, 1947).
"Plant Records", pp. 43–76. These contain about 40 records of Bedfordshire plants, many of them new to the county.
3. BRITISH BIRDS. Vol. 40 (1947).
 - (a) "Unrecorded note of Green Woodpecker." No. 3, p. 88. K. E. L. Simmons remarks on the more unusual notes of the Green Woodpecker (*Picus viridis phillius*) heard in Heath Wood, Whipsnade.
 - (b) "Mid-August song of Garden Warbler." No. 5, p. 146. C. W. Towler reports hearing a Garden Warbler (*Sylvia borin*) singing at Biggleswade on 18th August, 1945.
 - (c) "Courtship feeding of Great Tit." No. 7, pp. 213–4. Some observations by B. H. Alabaster on a pair of Great Tits (*Parus major newtonii*) on 29th April, 1947, at Dunstable.
 - (d) "Courtship display of Starling." By B. H. Alabaster, No. 8, p. 247. Notes on a pair of Starlings (*Sturnus v. vulgaris*) seen at Dunstable on 27th April, 1947.
 - (e) "Recovery of marked birds." No. 12, pp. 361–2. A Song Thrush (*Turdus e. ericetorum*) ringed in Oundle, Northants., on 4th June, 1944, was recovered in Kempston, Beds., on 20th March, 1947. A Common Heron (*Ardea c. cinerea*) ringed at Bromham, Beds., by members of Bedford School Natural History Society on 12th May, 1946, was recovered during December of the same year at Sandon, Essex.
4. JOURNAL OF CONCHOLOGY. Vol. 22 (1947).
"Aplexa hypnorum (Linn.) in Bedfordshire." By B. Verdcourt, p. 261.
5. ENTOMOLOGIST'S MONTHLY MAGAZINE. Vol. 83 (1947).
 - (a) "British Longicorn (Col.) records." By Raymond R. U. Kaufmann, pp. 34–7. Records *Rhagium bifasciatum* F. from Aspley Guise.
 - (b) "A list of sawflies (Hym., Symphyta) from Bedfordshire." By V. H. Chambers, PH.D., A.R.C.S., pp. 91–5. Localities, dates of capture and plants upon which larvae were found or adults taken in association with are given for 183 species. This is the first published major list of Bedfordshire sawflies.
 - (c) "A new British sawfly (Hym., Tenthredinidae) related to *Rhogogaster picta* (Klug)." By Robert B. Benson, pp. 96–9 (illustrated). Bedfordshire localities for the new species *Rhogogaster ch. chambersi* and for *R. picta* are given.

- (d) "The larva and male of *Neurotoma mandibularis* Zadd. (Hym. Pamphiliidae)." By V. H. Chambers, Ph.D., A.R.C.S., pp. 182-4. A male was bred from larvae taken on oak at Heath and Reach. The male and larva—both of which are fully described—and food-plant of this rare sawfly were previously unknown.
 - (e) "A note on the food of *Acrydium* Geoff. (Orthopt.)." By Bernard Verdcourt, p. 190. Mentions the occurrence of *A. vittatum* (Zett.) and *A. subulatum* (L.) in the county without giving localities.
 - (f) "The British distribution of *Stenocorus meridianus* L. (Col., Cerambycidae) and its aberrations." By Raymond R. U. Kaufmann, pp. 191-4. Bedfordshire localities for the type form are given.
 - (g) "Cerambycid (Col.) and Asilid (Dipt.) records from King's Wood, Bedfordshire." By B. R. Laurence and B. Verdcourt, p. 197. A short note on captures from King's Wood and Totternhoe, comprising nine Coleoptera—three possibly new county records—and three Diptera.
 - (h) "Aggressive behaviour of Syrphids (Dipt.)." By B. R. Laurence, p. 219. Records *Chrysotoxum verralli* Coll. from Luton.
 - (i) "Further British records of *Choleva cisteloides* Froeh. (Col., Cholevidae)." By D. K. Kevan, p. 245. This beetle is stated as known from the county.
 - (j) "The parasites of British birds and mammals. xxiii. Notes on *Stenopteryx hirundinis* (L.) and *Crataerina pallida* (Latr.) (Dipt. Hippoboscidae)." By G. B. Thompson, pp. 268-70. Includes a bare record of *C. pallida*—a parasite of the swift and house martin—from Bedford.
 - (k) "Biological notes on *Rhadinoceraea gracilicornis* (Zadd.) (Hym., Tenthredinidae)." By V. H. Chambers, Ph.D., A.R.C.S., pp. 271-3. Eggs were laid upon *Adoxa* in captivity by females taken at Heath Wood, Whipsnade, and larvae reared. The larva, food-plant and other biological details of this sawfly are described for the first time.
6. ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION. Vol. 59 (1947). "Note on *Orthopelma luteolata* Grav. (Hym., Ich.)." By B. Verdcourt, p. 34. Numbers of this ichneumon were bred from galls of *Rhodites rosae* collected near Ravensborough Castle on the Barton Hills, 28.1.42.
7. TRANSACTIONS OF THE HERTFORDSHIRE NATURAL HISTORY SOCIETY AND FIELD CLUB. Vol. 22 (Part 5, November, 1947). "A list of the vertebrates of Hertfordshire 3—Birds." By H. H. S. Hayward, pp. 173-226. A few Bedfordshire localities for species of birds—apart from those taken from earlier publications—are given on pp. 186, 191, 195, 212, and 218.
8. THE NATURALIST. No. 822 (July-September, 1947).
- (a) "*Cerastium brachypetalum* Pers. in Britain." By E. Milne-Redhead, pp. 95-6. Records this interesting plant found by the author on one of the Society's field meetings at Wymington. The plant has been known for many years on the Continent and had been expected to be found in Britain. Its status as a British plant has still to be decided.
 - (b) "The Britanic distribution of *Strangalia maculata* Poda (Col., Cerambycidae) and its aberrations." By R. R. U. Kaufmann, pp. 97-105. Several Bedfordshire localities are given.
9. SUNDAY TIMES. 27th April, 1947.
Report on a Hoopoe (*Upupa e. epops*) seen at Biddenham, Bedford, during 8th and 9th April, 1947.

LIST OF MEMBERS

OF THE

Bedfordshire Natural History Society and Field Club.

a—Associate.*s*—Student Member.*j*—Junior Member.

Adams, W. R., 36 Britain Street, Dunstable.

Adkin, B. C., M.A., F.L.S., Shuttleworth College, Old Warden Park, Biggleswade.

Alabaster, B. H., 51 Houghton Road, Dunstable.

a. Allison, Mrs. J. M., 11 High Street, Sandy.*s.* Allison, Miss Irene Jean, B.A., 11 High Street, Sandy.*j.* Armstrong, J. G., 5 Waterloo Road, Bedford.

Ashburnham Training College, Ashburnham Road, Bedford.

Ashworth, J., 36 Havelock Road, Luton.

Astles, Miss E. M., "Alvista", High Street, Flitwick.

Atkinson, Miss H. M., 92 Kimbolton Road, Bedford.

Bagshawe, T. W., F.S.A., 50 Storey's Way, Cambridge.

Baker, J. J., 7 Cardington Road, Bedford.

s. Baker, P. L. R., 36 Highfield Road, Luton.

Ball, C. M. R., Home Farm, Potton.

Bamford, M., 63 Amptill Road, Flitwick.

Barnes, H. F., M.A., Ph.D., 27 Rothsay Road, Bedford.

Bedford, Froebel Training College, 14 The Crescent, Bedford.

Bedford High School, Bromham Road, Bedford.

Bedford, His Grace the Duke of, Crowholt, Woburn, Bletchley, Bucks.

Bedford Modern School Field Club—*per* G. H. Heath, B.A.

Bedford School Natural History Society.

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BEDFORDSHIRE NATURAL HISTORY SOCIETY & FIELD CLUB

RULES

1. The Society shall be called the Bedfordshire Natural History Society and Field Club.

2. The objects of the Society shall be to encourage the study and investigation of the natural history of the County and to record the results of such investigations, publishing and disseminating such information as may be considered relevant. The Society shall publish a Journal.

3. The Society shall do all within its power to protect and preserve from exploitation and destruction those areas of the County which may be deemed advisable, and shall discourage the extermination or removal of any rare or characteristic species; at the same time using its influence with landowners and others to safeguard the plant and animal life of Bedfordshire.

4. The management of the Society shall be vested in a Council consisting of a Chairman, Secretary, Treasurer, Editor and ten voting members, all of whom shall be elected annually. The President (who shall also be elected annually) and any Vice-Presidents shall be *ex-officio* members of the Council. The Council shall have the power to co-opt members for Special Committees and to fill vacancies.

5. The Council of the Society shall approve each nomination for membership, but subject to this proviso, membership shall be granted on payment of the annual subscription, which shall become due in advance on the first day of January in each year.

Until such subscription is paid no person shall be deemed to be a member of the Society, and shall not be entitled to any of its privileges. Members admitted during the last three months of any year shall be granted membership until 31st December of the ensuing year on payment of the ordinary annual subscription. Members whose subscriptions are twelve months in arrears shall not be eligible for any of the privileges of the Society and may be barred from further membership at the discretion of the Council.

The Society shall consist of Ordinary, Corporate, Associate, Student and Junior Members, defined as follows:—

- (a) Ordinary membership entitles a person of any age to all the privileges of the Society, including a copy of the JOURNAL, for an annual subscription of 10s.
- (b) Any Institution approved by the Council may affiliate to the Society and become a Corporate Member on payment of an annual subscription of 10s. Such affiliated institutions shall have the privileges of one Ordinary Member.
- (c) A Student Member is a person engaged in whole-time study who, on payment of an annual subscription of 7s. 6d., has the full privileges of an Ordinary Member.
- (d) An Associate Member, on payment of an annual subscription of 5s., is entitled to the privileges of an ordinary member, but shall not receive the JOURNAL.
- (e) Junior membership is open to all persons under the age of 16 years who, for an annual subscription of 2s. 6d. shall receive the same privileges as an Associate Member, but shall not vote. No ordinary or student member under the age of 16 years may vote.

RULES

6. The Annual General Meeting shall be held in Bedford in the month of February, and the Council shall arrange at their discretion Ordinary, Sectional and Field Meetings at suitable intervals.

7. Minutes shall be kept of the Annual General and Ordinary Meetings of the Society and of Meetings of the Council. Such Minutes shall be read as the first business of the next ensuing meeting of the same kind. At the Council Meetings five members shall form a quorum.

8. All Members shall receive due notice of the Annual General, Ordinary and Field Meetings of the Society, and shall have the privilege of attending and introducing (unless otherwise indicated by the Council) two visitors.

9. The Society shall require all members intending to resign at the termination of any year, to give notice in writing to the Secretary not later than 30th November of that year.

10. The Accounts of the Society shall be completed to 31st December of each year, and shall be audited by such approved Auditor as the Council may direct. The Balance Sheet, together with the Secretary's and other Reports showing the progress of the Society, shall be submitted to the following Annual General Meeting.

11. The funds of the Society shall be both utilised and invested by resolution in Council, and the banking account shall be held jointly in the names of the Treasurer and Secretary.

12. The Council shall encourage Members of the Society to undertake special field investigations within the scope of the Society's work, and the Society shall co-operate with other local or national organisations in the carrying out of special surveys or enquiries.

13. No rule shall be altered and no new rules made except by a majority of votes of members present at a Special Meeting called for that purpose. The Council may at any time, and shall upon a requisition signed by not less than twelve voting members, convene a Special Meeting and a notice stating the purpose of the meeting shall be sent to each member not less than seven days before the date of the meeting, at which no business shall be considered except that for which it was convened.

14. The Council of the Society may at their discretion remove from the register of the Society the name of any Member whose conduct is considered prejudicial to the interests of the Society.

15. A copy of these Rules shall be sent by the Secretary to each Member on being admitted to Membership of the Society.

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